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# Student Teaching at Doherty Memorial High School

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# IQP REPORT

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Student Teaching at Doherty Memorial High School

OCTOBER 13, 2016  
WORCESTER POLYTECHNIC INSTITUTE  
NATALIE WELLEN

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# Educating the Youth

This section goes through different aspects of being a public high school teacher in Worcester, Massachusetts. First, it talks about some of the more recent legislation, the lead up to the creation of these bills and how they have changed the school system. Next, the current curriculum is discussed, where it comes from and how the transitions were made to it. After, we go over the ranking of Massachusetts public school education overall, as well as the ranking of Doherty Memorial High School located in Worcester, Massachusetts. Finally, we discuss diversity in classrooms, including what it means to have English Language Learners as students.

## 1. Legislation

There has always been a strive for excellence within Massachusetts public education. As Mitchell D. Chester, Commissioner of the Department of Elementary and Secondary Education (DESE), has written:

The future of our Commonwealth is linked to maintaining our competitive advantage in the education of our citizens: we are not a state that will derive vast wealth from natural resources. (2014)

This belief that Massachusetts' key to success lies in education can be seen in the initiative that the state has taken in the past. Even without the more recent intervention of the Federal Government, Massachusetts has been willing to revisit curriculum to ensure its students are well-prepared for what life brings them after secondary school.

Most recently this is the case with the *Education Reformation Act of 1993*. In the lead up to this Act, a Presidential Report from 1983 was released out of President Nixon's office called *The Nation at Risk*. In the report the health of America's public schools were discussed. The report found that not only were public schools in a decline, but there was a "rising tide of mediocrity" throughout the nation (Chester M. D., 2014).

This shocking news sparked a nation-wide discourse on what our education should look like. Perhaps as a result of this discourse, Massachusetts soon began experiencing equity of education lawsuits.

These lawsuits were class actions from students all over Massachusetts who lived in the poorer areas. They claimed that their resources were not adequate enough to attain the same level of education as other, more well off districts (Suffolk County, 1993). In the second section of Part II Chapter V of the Massachusetts Constitution it states:

It shall be the duty of legislatures and magistrates, in all future periods of this commonwealth, to cherish the interests of literature and the sciences, and all seminaries of them; especially the university at Cambridge, public schools, and grammar-schools in the towns (Adams, 1780).

It was this section of the Massachusetts Constitution that the law suits cited as the basis of their claim to a decent education. In 1993, these law suits won in court, requiring the state of Massachusetts to enforce a quality education for all students in the state. During that same year the *Education Reform Act* was signed into law, changing what those students had come to understand about the schooling system.

Before the *Education Reform Act of 1993* each school district of Massachusetts was expected to fully provide for their public schools. In fact, most everything about public education was decided at the local level (Suffolk County, 1993). Once the *Reform Act* passed though, many changes occurred: school districts were supplemented funds by the State so that every district could function at a decent level, there were higher standards for gaining a teaching license, teachers were to be provided with continuing professional development opportunities, state standards were implemented, a state run test administered to test those standards, curriculum frameworks were created, charter schools were offered as a way to increase parent choice and as an incentive for public schools to do well, and if any schools performed too poorly they could be turned over for state intervention. The goal was to still allow for as much local control as possible, while

giving the state a way to make its schools accountable for the education promised to Massachusetts citizens in their Constitution.

Later throughout 1996 and 1997 a new study was being released called the *Third International Mathematics and Science Study (TIMSS)*, which would continue on to become a quadrennial study (TIMSS & PIRLS International Study Center, 2015). The first *TIMSS* gathered data on students from 41 different countries focusing on three different grade levels: fourth, eighth, and twelfth (National Center for Education Statistics, 1999). *TIMSS* found that though America was about average in math and science for fourth grade, we moved further and further below other countries with eighth and twelfth grades (National Center for Education Statistics, 1999). This 1995 study found that America's ninth grade mathematics curriculum was approximately equivalent to other countries' seventh grade mathematics, and our eleventh grade science was approximately equivalent to others' ninth grade science (National Center for Education Statistics, 1999). Not only that, but as *TIMSS* also looks at the implementation in the classroom, they were able to find something important that countries that performed the best were doing that schools in the United States were not, which was having their lessons focus on why things work the way they do rather than just how to do it (National Center for Education Statistics, 1999).

Not long after *TIMSS* was released, the United States Congress began working on their own education reform. What came out of Congress was a bipartisan bill supported by minorities and special education groups called *No Child Left behind (NCLB)*, signed into law on the 8<sup>th</sup> of January, 2002 by President George W. Bush (Public Broadcasting Station, 2002). *NCLB* was a reinvigoration of Lyndon B. Johnson's 1965 *Elementary and Secondary Education Act*. The goal of *NCLB* was to provide the Federal Government a way to guarantee a quality education throughout the United States. Not only this, but they wanted to do so while still allowing as much local control as possible, something similar to what Massachusetts did with their *Education Reform Act* (Public Broadcasting Station, 2002).

How *NCLB* did this was by having states create their own curriculums and state tests, which the Federal Government would fund, and also having a national testing standard for states to live up to called the National Assessment of Educational Progress (NAEP) (Public Broadcasting Station, 2002). Further, since a major part of the goal of *NCLB* was to ensure that English Language Learners, disabled students, poor students, and minority students were all given a high quality education, the score reports that *NCLB* relied on were required to be broken up into those subgroups as well as giving the school's overall score on the test. In this way the government could track if a school was improving their education overtime, not only for the more easily taught students (Public Broadcasting Station, 2002). Then, if a school does not improve annually or maintain 100% proficiency for multiple years in a row, either as a whole or in the subgroups, then each subsequent year a new intervention is placed on the school. At first students are allowed to transfer to a school of their choice, then free tutoring is offered, and finally the state will intervene, which could mean firing the principle or reorganizing the employees altogether (Klein, *No Child Left Behind: An Overview*, 2015).

The most contentious part of *No Child Left Behind* was the interventions that were placed on poorly performing schools. Many schools were floundering under the weight of all of these interventions, and there was little to no flexibility in how to handle them. This problem was only growing worse as it became clearer that no school in the country was going to reach 100% proficiency in either mathematics or reading. Further, educators across the country were not impressed with every state's standards. In some states, the same students who passed as proficient in the state's test failed in the National Assessment of Educational Progress, yet *NCLB* had no provisions for what to do in this case (Klein, *ESEA Reauthorization*, 2015).

It was these problems and more that President Barak Obama's *Every Child Succeeds Act (ESSA)* sought to remedy (U.S. Department of Education, 2016). This new law required states to submit their standards for approval so that standards across the country could be said to prepare students well for college and careers (U.S. Department of Education, 2016). The Common Core standards were some of the first to be approved, but they are not required by law. Also, this new bill no longer measures student and teacher

success on test scores alone, instead it requires four different measurements of success (Klein, ESEA Reauthorization, 2015). Then, if a school is not performing well enough, either as a whole or in any one subgroup in any of these four measurements a couple years in a row, the state is in charge of interventions. Unlike before the state is freely able to choose or create new interventions that it believes may work best in that particular situation (U.S. Department of Education, 2016). The big transition year for all of this to begin taking place will be the 2016-2017 school year, and during the 2017-2018 school year each state is expected to submit its Accountability Plan to the Federal Government for approval (Klein, ESEA Reauthorization, 2015).

Massachusetts and the United States are continuously working to ensure our country stays competitive in education and the high paying careers that come as a result of it. Throughout this process new legislation is being debated, and new ideas tried out. What is most evident from all of this are the main goals of our country, that all students, no matter their background, should receive a public education that prepares them for them for technical trades and college.

## 2. Curriculum

In 2007, after five years of *No Child Left Behind*, an idea was formed, to compare educational standards that all of the states had developed and choose the best from all of them (Common Core State Standards Initiative, 2016). Then in 2008 a committee was formed to achieve this task, and in 2010 a new set of standards was accepted by the National Governors Association (NGA) and the Council of Chief State School Officers (CCSSO) (Chester M. D., 2014). This conglomerate of educational standards would become the Common Core.

The goal of Common Core was to provide high standards that push students to achieve while helping them become globally competitive (Common Core State Standards Initiative, 2016). In order to achieve this, developers focused on what students needed to know in order to be successful in careers and colleges and what they would need to know to get there (Common Core State Standards Initiative, 2016).



Common Core was approved by the NGA and the CCSSO in December of 2010, and by fall of 2011 Massachusetts schools were already fully implementing the new Common Core standards, with all the schools expected to do so by the fall of 2012 (Chester M.D., 2011). In fact, during this short time Massachusetts was able to add more standards to the curriculum that the state felt were missing from the original (Chester M. D., 2011).

The set of standards that Massachusetts implemented in its schools is called the Curriculum Framework. This framework not only lists the expected standards, but for high schools, which has a single set of standards for all math courses, it also gives model courses for how a school may choose to distribute the required standards. For example, the Framework gives options for running a traditional Algebra I course, or for a different kind of course called Math I which covers topics traditionally from Geometry and Algebra I at the same time, mixing them up over the course of two years (Chester M. D., 2011).

This Framework has been met with much praise from the Doherty High School Mathematics Department. Shortly before Common Core was approved by Massachusetts, the Math Department had been trying to redesign its curriculum to boost student participation in its AP Calculus Course (Razzaq, 2016). After Doherty High School transitioned to the Common Core Standards in fall of 2011, they have seen a large uptake in students taking the Calculus courses offered. In fact, they have needed to expand the program, so that no longer is there only one AP Calculus AB, but also a Calculus Honors and Calculus BC course offered at Doherty (Razzaq, 2016).

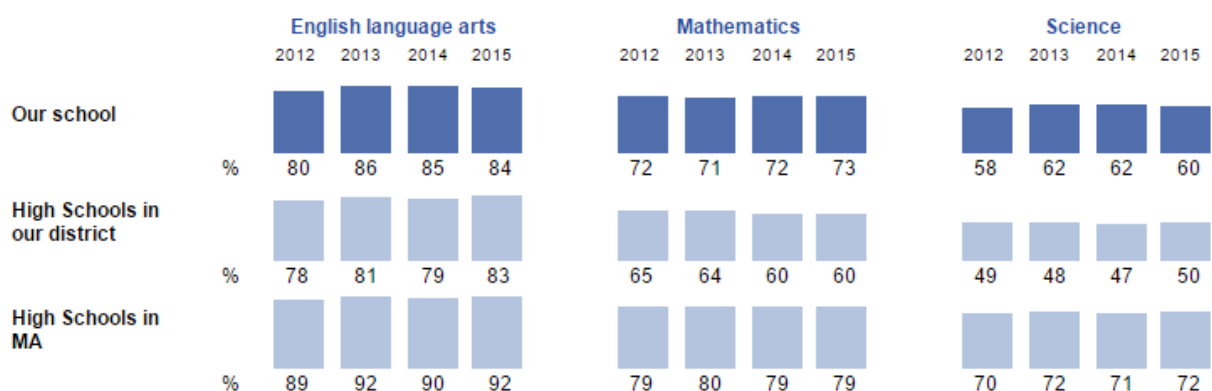
The Common Core standards have raised the bar for what students are expected to know, especially in High School Algebra I. This has led to a “trickle up” effect in the coursework for following math classes, and in the end boosts students’ confidence in their ability to perform higher mathematics (Razzaq, 2016). Although the standardized tests are not always popular, and many teachers prefer to have a bit more flexibility as they teach, it is generally agreed upon, at Doherty High School, that the Common Core was a great thing (Razzaq, 2016).

### 3. How does Doherty Compare?

Massachusetts public schools have the best test scores for Reading and Mathematics across all fifty states in the country (Bernerdo, 2015). Massachusetts is also home to the second safest schools in the country, where safe means no threats or usage of weapons at school, no bullying, and no youth incarcerations (Bernerdo, 2015). Even when focusing on low-income student education, school choice, teacher quality, and curriculum standards, Massachusetts still rates number one as a state (Ladner, 2015). If we choose to compare states by the number of high ranking schools they have, then Massachusetts comes in fourth overall, but having the second highest percentage of “gold medal” schools (Morse, 2015). No matter what one focuses on in ranking public education by state, it is clear that Massachusetts is one of the best places for education.

Zooming in to Doherty High School, as far as test scores are concerned, Doherty is considered to be a part of the lower 17<sup>th</sup> percentile in Massachusetts (DESE, 2015). In Figure 1 on the next page, we can see just how Doherty’s scores compare to the rest of the state, and though they vary noticeably,

**FIGURE 1: STUDENTS SCORING PROFICIENT OR ABOVE ON THE MCAS FOR 2012-2015**



(DESE, 2015)

we also find that Doherty High is doing better than the other high schools in Worcester Public Schools. When it comes to student make-up, Doherty has smaller populations of the subgroups that historically score worse than the district overall, but much larger populations than the state as a whole, as can be seen in Figure 2 below:

**FIGURE 2: SOCIO-DEMOGRAPHIC BREAKDOWN OF POPULATION**

By high needs population	Our school		High Schools in our district		High Schools in MA	
	#	%	#	%	#	%
Economically disadvantaged students	510	35.4	2,861	43.8	56,653	21.8
Students with disabilities	226	15.7	1,344	20.6	41,669	16.1
English language learners	282	19.6	1,491	22.8	14,527	5.6

(DESE, 2015)

Finally we can take a look at the racial breakdown of the population in Figure 3 below, where we see that Doherty and Worcester at large is much more ethnically diverse than the rest of Massachusetts.

**FIGURE 3: RACIAL AND ETHNIC POPULATIONS**

Enrollment by Race/Ethnicity (2015-16)			
Race	% of School	% of District	% of State
African American	15.1	14.9	8.8
Asian	8.7	7.5	6.5
Hispanic	30.3	40.8	18.6
Native American	0.2	0.2	0.2
White	42.7	32.5	62.7
Native Hawaiian, Pacific Islander	0.0	0.0	0.1
Multi-Race, Non-Hispanic	3.0	4.1	3.2

**(DESE, 2015)**

Overall we found that Massachusetts has the best schools in the country. Further, although Doherty is rated in the bottom 17 percent of schools, they have high populations of the target populations for score improvement due to historically poor performance. Our education may still be a long way from 100% proficiency, but schools like Doherty Memorial High School are working hard to close the gap, student by student, in a diverse environment.

#### 4. Diverse Learners

Doherty High School is a home to a wide variety of cultures and languages. At Doherty, in the 2014-2015 school year 19.6 percent of students were English Language Learners (DESE, 2015). It turns out that at Doherty High School alone over fifty different countries are represented by the English Language Learner population (Quinn, 2015). Some of the many languages for these students to speak at home include Spanish, Portuguese, Albanian, Twi, Arabic, Napoli, Somali, and Vietnamese (Quinn, 2015).

In order for schools like Doherty to identify English Language Learners (ELL's) the school district of Worcester uses a variety of tests. First of all, a home language survey is included in the registration packet for all students for the parents to fill out. If the family says they speak a language other than English at home, that student is then asked to take an oral test for two of the elements of language, listening and speaking

skills. If the student is placed in the third grade or above then another separate test is also administered to that child that tests the other two language skills, reading and writing. Along with this, students in third grade or higher are also asked for a sample of their writing in their native language. All of this testing helps the schools understand where that student is in their language development, what kinds of tasks and classes are most appropriate for the student, and which skills need more work for the student to succeed.

Once the testing is done, students are given a level to indicate their understanding of English. The different levels for ELL students are for the teachers more than anything else. Level 1 and 2 are the lowest level, meaning the student has a hard time understanding and speaking anything in English. Level 3 means that the student can use simple sentences and communicate at a still basic level. Level 4 means that the student is still having trouble in one or more language skill, but can communicate very effectively. Level 5 is the last level, and as far as in the class goes, it is often hard to tell that these students were not native speakers. The levels do not restrict which classes a student may take in any way. Instead, what they do is let a teacher know approximately how much English a student understands so that the teacher may appropriately shelter their lessons.

Sheltered English Immersion (SEI) is what one refers to when one says shelter a lesson. The idea of SEI is that though a student may struggle with the language, it does not diminish their ability to learn new things. What SEI seeks to do is teach in such a way that students with a very basic understanding of English can discern the topic at hand, and demonstrate mastery at least at some level. For example, in a science class where students are expected to write out a detailed lab report to demonstrate understanding, a low level ELL student would not be able to complete this at the same level. However, sheltering encompasses the idea that an ELL student can still understand the concepts of the lab, even if there grammar, spelling, and sentence complexity would not be considered acceptable for a native speaker, and grade their work according to this expectation. The idea being we should challenge students, but not beyond what is reasonable to expect from them.

Not only does SEI hold all students to the same content standards, but it also points out that any class is a good time for an English Language Learner to receive feedback on their English. The best way for someone to learn a language is to be immersed in it, and practicing it in a variety of situations. The idea of SEI learning is to use every class as a chance to facilitate that kind of learning. The goal inside the classroom then is to not only teach mathematics for example, but also to develop academic language that can help ELL students be successful in formal situations like job interviews.

Teaching ELL students requires different preparation than teachers are traditionally used to. Beyond the curriculum they were hired for, teachers now need to be conscious of teaching English to their students as well. ELL students are not the only source of diversity in the classroom though. There has always been some level of diversity in the classroom, and always will be because of the different ways that people learn. People are far from the same, and that means that one may prefer seeing diagrams drawn on the board, while another may prefer seeing the equations. It may mean that one student prefers watching someone else do the work first, while others prefer diving in to a problem and making their own mistakes. In a classroom with twenty to thirty students, the teacher must always be aware of the many different learning styles and balancing their needs.

Diversity comes from many places, the wide variety of cultures that students may hail from, the many languages that people speak and think in, and the many ways that people learn. In the classroom all of these things come into play. This diversity can be difficult, especially while trying to manage and teach a class, but it is also a major part of what keeps teachers learning and students succeeding every day on the job.

## Well- Structured Lessons

Lesson plans allow a teacher to know the goals for the day, so that they can come prepared to the classroom and be efficient in completing objectives. A forty-five minute period is not very long to teach a student pre-calculus, especially when they spend little to no time outside of class on the material (see Appendix: Student Surveys). To compensate for this, and the quick transition between subjects, a teacher can utilize tools such as a do-now to warm students up and refresh them on what was happening the day before. The teacher also needs some way to measure understanding, both from previous material and for current material, in this way a teacher can properly adjust to the students needs. The material must also be suitably challenging, since this does not mean reducing standards for students, this can mean taking more time through different sections of the material, and giving students different perspectives on the material. Finally students should be engaged in a lesson. Lectures can be appropriate when first introducing a topic, however if these are the only way material is presented, then often students disengage and do not learn the material. A well-structured lesson plan will take into account these different elements, so that in the classroom a teacher can focus on her students, because these things are already laid out.

The do-now is a tool of the teacher that keeps students involved in the class as soon as they walk in the door. It is very powerful in that it refreshes students on the material they have been learning, or material from previous units. In this way the do-now can be used to study for the MCAS or it can be used to keep students thinking about what they are currently learning in the class. Each day for my classes I would have a do-now for the students to complete. While the students were working on the do-now this would give me a chance to pass back quizzes and pass out materials needed for that class. The do-now would depend on the material we were learning that day, but most of the time it would relate to what we were learning during that unit. Especially if the material we were learning that day required not only the previous day's material, but something from previous days or weeks, I would use the do now as a way to refresh on that older

material. When starting a new unit, this was an opportune time to instead have the students work on skills they would need for the MCAS, or since I was teaching many juniors and seniors, the SAT's. Example do-nows are:

- Graph  $\arccos(x+1)-1$  This do now allowed me to check understanding from the previous day's lesson.
- What does SOHCAHTOA stand for? This is an example of a review of previously learned material we would need for that day's lesson.

A number  $n$  is increased by 8. If the cube root of that result equals  $-0.5$ , what is the value of  $n$ ?

☐ (A)  $-15.625$

☐ (B)  $-8.794$

☐ (C)  $-8.125$

☐ (D)  $-7.875$

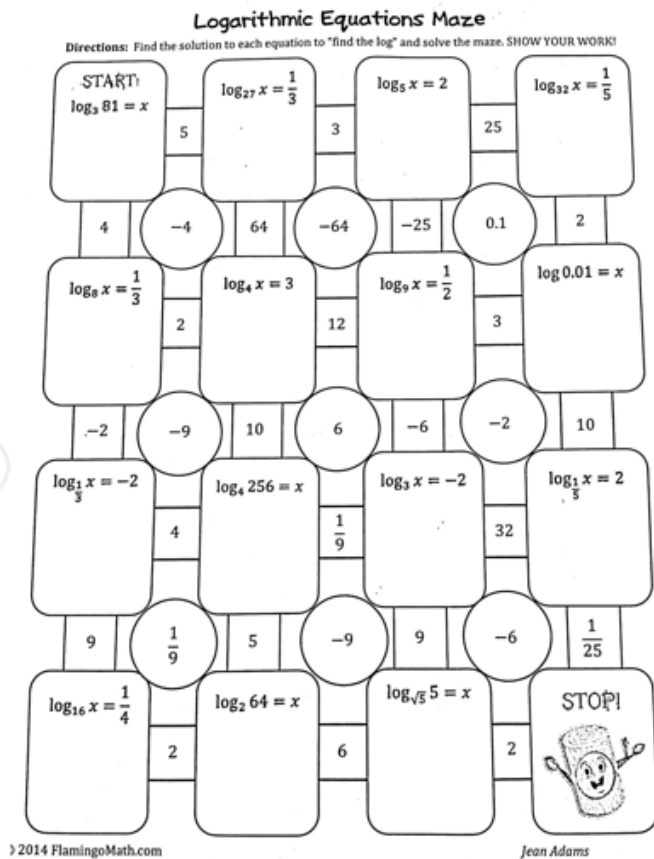
☐ (E)  $421.875$

•

Which is an example of an SAT prep question we did at the start of a new unit.

The do now is only one way that a teacher can measure student's understanding. However knowing what one's students are struggling with or understanding very well is an important task of the teacher's. In this way a teacher can properly adjust lesson plans for the next day, or even that day as well depending on the lesson. Homework is another way that a teacher has to check student understanding. Every Monday, Tuesday, and Wednesday the students would be assigned homework. Most of the time it was from the section in the textbook that related to the topic we discussed in class, however students would also be assigned worksheets. For example:





This was a homework assigned to students while learning about logarithms. Due to its structure it was easy to grade, and allowed me to quickly give them feedback on how they were doing before the quiz at the end of that week.

One of the main ways that understanding was assessed in the classes I taught was through the use of a weekly quiz or test. The two lowest scores for quizzes were dropped, which helped students who may have been struggling more than usual one week. The most important part of quizzes is that they give a clear overview of how the class is doing. In this way if a larger number of students than normal struggled than normal, I as a teacher know what material to review more in depth than before. In certain cases this has meant that the unit is extended a week longer than previously planned for, so that students can develop a

stronger grasp on the material before being tested on it. For example this is the case when I taught the college level precalculus courses logarithms.

Another way that student's understanding was measured involved walking around during individual or group work. In this way student work contributed to a lesson in many different ways. Not only did it engage every student in the classroom, but it gave me a chance to check on students understandings. From other measures in the class such as do-nows, homework, and quizzes, I would have an idea of which students were struggling. In this way I could give them extra help during this time. Many times as the teacher I would not only check on students who I knew were struggling, but walk around and check one problem on the worksheet for each student so that I could give immediate feedback on what they needed to work on.

The material that is presented to students always needs to be sufficiently challenging. The teacher can check that students are being challenged through the measurements that they have built into their lesson, and if students are struggling they do not lax expectations, only give students more tools with which to tackle the challenges facing them.

Often to keep students challenged is a very difficult task in a class of over thirty students, since no one learns at the same pace. One way that I tried to keep students who were quicker at learning the material engaged was with the use of challenge problems. These were problems that required students to think beyond what we had gone over in class and include previously learned items. Further these questions often asked them to try and explain why the mathematics worked the way that it did. For instance during the unit on logarithms I asked a few students who finished their work early to try and show me why the quotient rule worked. In this way, students who were struggling with the application of properties of logarithms were given the time they needed for the worksheet, and students who understood the material well were still engaged and challenged in the lesson.

In the lesson plans that I had written up, the objectives came in the main part of the lesson. More often than not I used a lecture style to introduce a new topic and perform some examples. This is when I would define the objectives of the lesson for that day, or possibly the next few days. Further the objective of the unit was always clearly written on the board before class started, so that students could understand what was expected of them. What helped me best as a teacher was to list out these objectives clearly in the order that I was to present them to class. However, while writing up the lesson plans I would brainstorm the questions that students should be able to answer when the lesson was complete. First and foremost I had to prioritize what students should understand. If the class was struggling and asking many questions, then what did we need to get through at a minimum. These are the objectives I would list furthest to the left in my lesson plan outline. Next I would ask in what ways can I as a teacher present the material more clearly for the students to understand. This would determine the order that I wrote my objectives in. Finally I would ask what types of questions students should be able to answer. This would determine the activities that the class would do to reinforce the lecture, and it would also determine the homework problems that I assigned to students, the do-nows for the next few days, and the types of problems students would see on the quiz or test. By understanding what I wanted to test the students on, I was able to stay focused on the important aspects of what students were learning, and use that to create example problems for the class, which were also included as part of the lesson plan.

Having these objectives clearly organized in my plan further allowed for a smoother lecture process so that the class could move on to the activities more quickly. Because my plans were organized in this way, I could more easily visualize how I wanted to use the space on the board for the class. If the lesson had many definitions, I would keep them on the board throughout the class, and written in a different color so that they were easier to read. Further, having already planned out the example problems allowed me to focus on the best presentation of them, which meant using different colors to signify different operations so that students who took notes could more easily look back at the examples on the board and follow what had happened.

Often what I found helped best with structuring the lessons and objectives was to plan out the entire week. In this way my lectures would relate directly to activities planned for later days in the week, and at the very start of the week, students would understand the objectives and expectations that were planned for them.

Finally, a lesson plan needs to incorporate student engagement. During a lecture class this would mean having prepared questions to ask the class. Some strategies that I could use to increase student engagement for this included cold call, which is when you ask a question, pause to give students a chance to think, then call on a student regardless of whether or not they are raising their hand and pause again giving them a chance to gather their thoughts before answering. Another strategy is called wait time. Often the same few students will raise their hands to answer a question, so to increase student engagement the teacher can wait, giving other students more time to think about the question and join in the discussion. At the end of this kind of class I would also have problems for students to work on and check their understanding with. Students would have the ability to talk to a neighbor, but often times they would work on their own. Most important though, I would take advantage of this time to walk around the class and measure student understanding.

Other days of the week would be activity days. Often times this would be Thursday, so that students would have a day to reinforce the material before the quiz or test on Friday. The activities would always clearly relate back to the objectives of the unit we were studying, and were meant to give the students a chance to work together. Different activities for the classes included Stand Up Hand Up Pair Up, or SUHUPU for short. This was an activity that involved giving the students each one problem, in this case for logarithms, and having them pair up with other students by giving high fives to each other. The problems that we used on two different instances are attached to the back in envelopes. Each problem comes on a card that has the correct answer on the back. The students then ask their partner to answer their problem, and if their partner gets stuck they should then be able to help them come up with the answer. This activity was especially great

because it got students on their feet and moving throughout the classroom. It also allowed them to interact with a wider variety of peers than they normally would have the chance to in class. A further strength of this activity is that students were in a situation that naturally led them to ask their peers for help in class. In this way students who had a stronger grasp on the material could teach other students. This was a strong benefit to both parties since it has been shown that teaching material is one of the best ways to learn that material, and the other student would receive one on one help.

Another activity that we did was create a Trig Book. This summarized the work that students did over their fourth quarter of precalculus. Trigonometry, which is a unit that requires a lot of memorization, also requires a lot of practice. This trig book allowed students to summarize the information that made up the objectives of our class, and do so in a fun and creative manner. The book first needed to be folded by students. This required students to practice following verbal directions, and work on their spatial reasoning. The first page or two, depending on the size of the student's writing, consisted of a chart of all six of the trigonometric functions that we studied and for each radian on the unit circle it's measurement in degrees and at each of the six trig functions. The next page in the book was a drawing of the unit circle that contained all of the angles in radians, as well as their coordinates on the Cartesian Plane. With the use of a brad, a larger circle was then cut out with an opening so that it resembled Pacman that allowed students to cover up most of the unit circle and quiz themselves on the angles and coordinates of the circle. The next page of the trig book had a smaller book pasted on it to make better use of space. This book is where we summarized everything that we had learned about the graphs of the six trigonometric functions, included the signs that they took in different quadrants of the unit circle, and the graph transformations that could be applied to them. The honors precalculus class then had on the next page another such smaller book pasted on it, this one was used to contain information on the function inverses for  $\sin(x)$ ,  $\cos(x)$ , and  $\tan(x)$ . This book nicely and compactly summarized all of the information that students learned in this unit, which could be used to

help them study for the final at the end of the year. A sample of a trig book can be found in the appendices of this paper.

I created a lesson plan each day for each class that I taught. These lesson plans contained in them the ways that I would measure student progress in the objectives of the class, and keep students engaged in the learning process. The do-now is a powerful tool that I used to get students in the correct mindset as soon as the bell rang. These and other things such as homework and end of the week quizzes and tests would also be used to measure students understanding of the material, so that as a teacher I was constantly aware of where my students were in the material and how they were faring with their understanding. Knowing this I could keep my lessons appropriately challenging for the students and clearly define the objectives of the lesson for the students as well as myself. Finally the lessons needed to keep students engaged, which I did through asking questions, giving practice problems, and creating activities for students to do that clearly related to what we were learning. A lesson plan not only helps organize the lesson, but it empowers the teacher to work more efficiently and be more flexible since they have a complete understanding of the tasks to be completed and the overarching goals of the class.

## Adjustment to Practice

Each lesson plan includes ways that the objectives are measured. This alone does not make for a good teacher though, a teacher needs to be able to see how students are doing with the material, and then refocus the lesson based on what students struggle with, and what they clearly already understand. Adjusting one's practice is something that can be done in a moment's notice by a teacher, or planned out by differing one's lesson plans. Most importantly though it takes into account the different level of students for different courses.

Adjusting one's practice is something that can sometimes happen at a moment's notice. One example of this is later in the year when my college level precalculus students were doing a unit circle musical chair type activity. This activity was one that I had learned from a colleague, Ms. O'Leary, where students began by drawing a unit circle on the floor using duct tape and string. They then marked each spot that one of the angles on the unit circle went. To accommodate the number of students in the classes we used two unit circles. In this way each student could stand at one of the angles on the circle. Then I would play music, and while the music was playing students would walk or dance their way around the circle, and when it stopped they would stand at the nearest angle on the unit circle. Students would then each answer a question about their angle. The first question was, "Which angle are you standing at?" Since we had been studying trigonometry for a few weeks at this point, students were able to answer this question fairly easily and I only asked it for two rounds. The next question was much harder for students to answer though, which was "What is the measure of  $\sin(x)$  at your angle?" Because a majority of students were having difficulty with this question we spent more rounds asking students about it. This time it was closer to six rounds that we spent on the question. However, the next question, "What is the measure of  $\cos(x)$  at your angle?" was much easier for students to answer once they had spent time practicing  $\sin(x)$ , and so we were able to move on. In this way I was able to measure what students were struggling with quickly, and then adjust the activity accordingly.

Other times as a teacher that I would adjust, would depend on how students fared when answering questions during a lecture. This gave me a chance to see if students had grasped what I had introduced and were ready to move on, or if they were struggling and needed me to explain things in a different way. One of the best examples of this would be the do-now and homework questions. Many times I wanted to give students time to think further about the concepts, which is why they would practice them in the homework and then be asked about them in the do-now the next day. After checking the do-now I would know if students needed me to review the concepts more, or if they were prepared for me to move forward as

planned. Logarithms was the subject I taught that the most students struggled in. Because of this, I knew that I needed to structure more time into going over the do-now than I would normally. However, when it came to graphing problems the students tended to do better with the material, in this way I knew that I should keep moving forward with the material so that students would remain engaged.

Adjustments also need to be made to the lessons overall. My first week teaching I found that I moved much too quickly for all of my students. This could be seen in the differences in their test scores from usual with my mentor teacher Ms. Razzaq, and the scores they received on those tests and quizzes, which depended on the level of the class. Even students who were normally very good students had struggled on my assessments. From this I learned that I needed to reintroduce the material, and be more careful with my measurements so that I could better discern an appropriate pace for the students.

For example one of these topics was logarithms with the college level precalculus classes. To meet the needs of my students we carefully reviewed each of the logarithmic rules and how to condense and expand a logarithm with each one. After assessing my students by walking around when they worked individually and in groups, as well as through their homework and do-nows, I would know when students were prepared to move on to the next topic. Then as a review for the test, we organized everything we learned into a toolbox. One thing that I found was that students were uncomfortable with what they could do with a logarithm when they were not explicitly told to use one of the rules. By organizing the three logarithm rules and how to evaluate them into a toolbox, students were able to see exactly what they could do with a problem that involved a logarithm. This way as long as they understood everything in the toolbox they would be able to perform well on the test at the end of the unit.

The honors class on the other hand seemed to struggle a lot with graphing etiquette. Although they successfully produced a shape that resembled the graph we were creating, a disproportionate number of



students did not label their axes, or carefully scale them. In this way something like a  $\sin(x)$  curve would change width over time, when it should not. Because of this I created a lesson I called graphing boot camp. In this way the class practiced creating graphs, and I would check that they were properly labeled. This way I was able to adjust my lesson plans so that students could review concepts they would need to do well in the course, as well as keep practicing our current material.

Another adjustment that I would make is changing how the test or quiz was administered at the end of each week. For units that were based on memorization such as the unit circle and evaluating logarithms, students would be given a paper exam with no notes or calculator. Other tests would have a calculator and a non-calculator part so that students could be tested on their ability to use a graphing calculator as well for example, especially for more complicated graphs that they otherwise would not have time to examine in a testing situation. When I wanted to assess student's abilities to apply the tools we had learned in class, then I would allow them to create an index card, where on the front and back they could hand write different formulas and example problems from the material that could be used on the test. At the end of the test students then turned in these index cards so that I could ensure they had followed directions. Further, I also utilized two take home tests for the honors class. The first one was on graphing, I had polled the class to ensure they were comfortable with it. In this way I could test the students on graphing concepts that were more difficult and would take too long to do in class, as well as ask a wider variety of questions. The second take home test the honors class completed was a take home project on applications of trigonometry. It also included built in class time so that students would have the ability to ask me questions and work with peers. By using a project to assess student learning, I was able to incorporate a wider variety of problems, including ones that more clearly relate to the real world.

One of the major implementations of adjustment to practice comes from the differences in how honors and college level courses are taught. The honors course is for students who move at a faster pace in

the material and have a stronger background in mathematics. Because of this the class is expected to move at a faster pace than the college level class. This means that by the time I started teaching the class just before the fourth quarter, the honors class was over a unit ahead of the college level precalculus course. Not only does the honors level class move at a faster pace, but they are expected to show a deeper understanding of the material than the college level course. This means that I would either ask more questions of the honors class, or I would ask fewer but more conceptually challenging questions. In this way lessons and assessments were never exactly the same between the two courses. For example, for the honors class I expected students to be able to perform multiple types of transformations on a single trigonometric graph. However for the college level course, when we got to graph transformations I taught them how to perform multiple transformations, but it was not as important that they could show mastery on an exam, so I only asked one such question.

Adjustment to practice means that a teacher is constantly assessing the class, as well as reassessing her plans. In this way the classroom environment can properly be reformatted to best fit the needs of the students. These adjustments happen at multiple levels. A teacher may need to adjust the current lesson that students are being taught, the plan for upcoming lessons and the unit overall, and adjusting for the level of the course that students are enrolled in. In this way students can become reengaged in the learning process and the material can be more successfully taught to a wider variety of students.

## Meeting Diverse Needs

Most public classrooms have somewhere between twenty and thirty-five students in them. Not only that, but classrooms are expected to incorporate all types of students including ELL and special education students.

Separate is almost always unequal, which is why all students are being incorporated into the mainstream classroom for core subjects, yet it means that a teacher has even greater responsibility to address the differing needs in a classroom. There are many ways that a teacher can do this. This includes how material is presented, the different kinds of activities that student participate in, and the attention that different students receive.

When I taught, new material was often presented in a lecture style. If this was the case I was careful to make use of the many different white board marker colors available to me. Different uses I had for the colors included highlighting vocabulary words or formulas the class would need. It also allowed me to clearly title different sections of the material and keep the sections clearly separate while still being efficient with board space. Further if we were working on examples using multiple colors allowed me to color code steps that I took. For example while working on algorithms each rule in the logarithm toolbox was a different color. This way as we were going through an example problem each time I used one of the rules I could color code the work to match the toolbox. By color coding the material was well organized and more easily reviewed by students. This is especially important if a student falls behind the pace, because then they can still easily keep track of what happened in the lecture. This also made it easier for ELL students and students with special learning needs who may have had trouble understanding and keeping up with the lecture, since they could easily look back and see what was important. I would also use a certain color for directions on activities that we were doing if it needed to be written down on the board. This way students who had a difficult time hearing or parsing the directions would also be able to read them at any point in the activity.

I also used different ways of presenting the material. While the college level students were learning and memorizing the unit circle, we used a variety of methods. We started off with a PowerPoint that went over the material in a clear way. Thanks to the use of a wireless keyboard I was able to walk around the classroom while presenting and use proximity to keep students on task. We also used a lecture style to reinforce what students had learned from the PowerPoint the previous day, and to help drive the point

further we watched “Unit Circle Song” by Michael Bautista. This song was so popular that a number of students watched it at home that night, and I caught them singing it in class the next day.

During lectures I would be careful to use repetition. This was especially true when working on new vocabulary words or learning the names of properties and rules. This is useful not only ELL students and special education students, but for any student so that they can use the proper vocabulary to find what they are looking for online if they look up help outside of class. This meant that for students who struggled in class, and for students who were curious to learn more, they would have the tools they needed to make further explorations.

I introduced the material we were learning in a variety of ways. An activity I used to do this in my classroom was the use of a self-discovery activity:

**Directions:** Write down your answer to each problem to be handed in on a separate sheet of paper to be handed in. Be sure your name is on this paper, and write in complete and clear sentences. In your sentence that describes the differences between the two functions be sure to include which graph transformation you believe is occurring

1. If  $a$  is a constant, then how does  $a \cdot \sin(x)$  compare to  $\sin(x)$  the parent graph?
2. If  $b$  is a constant, then how does  $\sin(b \cdot x)$  compare to  $\sin(x)$ ?
3. If  $d$  is a constant, then how does  $\sin(x) + d$  compare to  $\sin(x)$ ?
4. If  $r$  is a constant, then how does  $\sin(x - r)$  compare to  $\sin(x)$ ?
5. How does  $\sin(b \cdot x - r)$  compare to  $\sin(x)$ ? Would you say that  $\sin(b \cdot x)$  or  $\sin(x - r)$  occurs first? (Remember correct use of parenthesis can help with this question)
6. How does  $a \cdot \sin(x) + d$  compare to  $\sin(x)$ ? Would you say that  $a \cdot \sin(x)$  or  $\sin(x) + d$  occurs first?

This was a calculator activity that was meant to introduce the students to graph transformations when applied to trigonometric equations. Students had previously worked with graph transformations during a unit earlier in the year where they transformed polynomial functions, the main difference was how they were applying these graph transformations. This was an activity that lasted one day, and then the next day we began

discussing the transformations in lecture. In this way students would have something to relate to the graph transformations that we discussed. This is the kind of activity that I needed to lend extra support to both ELL and special education students, but also allowed students who were more comfortable with the material in the class to really explore the transformations and think critically about how these factors affected the original  $\sin(x)$  function. Students would also have a chance to dig deeper into the material through the use of take home work, such as the trigonometry applications project the honors precalculus class completed. Further the requirement that students write in full and complete sentences allowed ELL students to practice their English and receive some feedback on grammar and spelling.

There was also a variety of individual and group work. Depending on the activity ELL students would be grouped together or they would be grouped with other students. If they were grouped together it meant it was easier for me to walk around and give the students more attention, but grouped with other students meant that they could practice conversational English and help other students or be helped depending on the material. For special education students I found there was no reason to group them together, and that it was often more helpful for students with IEP's to work with the other students like normal. It did mean for certain students that I had to be more careful who they worked with and sat near though. Whether it was individual or group work though, it gave me a chance to walk around and especially check that the ELL students and special education students had completed their notes and understood directions. It would also give me the chance to offer bonus problems to students who were otherwise unchallenged by the work.

The IEP's in the classroom were always met. Some students needed to sit at the front of the class, so they would be assigned a seat in the first or second row. Other students needed extra time on quizzes and tests, so they could take their work to another classroom and turn in the test after the period had ended. Other students required repeated instructions, and since this is something I did for every student, they were not being singled out in any way.

Through the presentation of new material, the student centered activities in the classroom, and checking in with individual students, students received many opportunities to meet and exceed the objectives of the class. Students experienced a learning environment designed to help them learn and expand on the material taught inside and outside of the classroom. No matter if the students had an IEP form, were still learning English, or got bored in class, different parts of the class were meant to meet this diverse offering of needs.

## Safe Learning Environment

In the classroom setting students require a safe learning environment. This environment is something that empowers students to ask questions, explore new concepts, and overall feel welcomed in the classroom. Creating this environment requires a multitude of things, including keeping routines so that students know what to expect, respecting student questions and answers as a teacher, and appropriately disciplining students in the classroom.

Routines are something that give students an idea of what to expect. The goal is to help reduce student anxiety about coming to class, because there are fewer unknowns to deal with. In my classroom we had a few routines. One of them was the structure of lessons in the week. Monday, Tuesday, and Wednesday were the days that new material was introduced. Usually this meant that Monday was more lecture heavy, and Tuesday and Wednesday there would be some new material along with an activity of some sort. Thursday would be the day that we reviewed the new material. This often meant that I would repeat the objectives of the week and clearly articulate what students were expected to demonstrate on the quiz or test for the week. Then students would be given an activity that would help them review the concepts, often times this activity would be group work. Finally Friday would be the day that students were formally assessed on the material. Students new to bring a quiet activity in case they finished early, and that Friday was the one day that they did not have a do now on the board.

The do-nows also had a routine. On Monday the do-now would relate back to review of a previous unit, or be a sample SAT or MCAS question for students to work out. In this way old material could be refreshed for students, even as we learned something new. If I thought it was needed though, I would have the do-now relate to something the students had been taught a few weeks ago that they would need to know for the lesson that week. In this way I could use do-now time as a way to review important concepts. On Tuesday, Wednesday, and Thursday, the do-now would review what students had been taught the previous day. Since the do-nows were graded, this meant that I could better assess where the class was in understanding the material and adjust my lesson either that day or for the rest of the week.

Homework was also assigned on Monday, Tuesday, and Wednesday. This would be in the form either of a worksheet, or as problems out of the textbook. Before class started I would have the homework written on a board behind my desk, so that students could clearly see their assignment for the evening and be prepared for the end of class. In this way even if lecture ran longer than I expected students would be able to complete their homework. The assignments were also available on Engrade, the online tool that most of the mathematics department at Doherty Memorial High School used to keep track of student grades. On Thursday's, students were told that their homework was to study. In this way students who had to work could take the time they needed to prepare for the formal assessment the next day.

During classes there were also routines and proactive responses that I had turned into habit to promote a safe learning environment. One of those things was to always thank students for asking questions. As a teacher it was my job to guide student learning, but if I do not know what is confusing the students, since I cannot call on everyone, students asking questions is one of the best ways that I can assess the understanding of material. To otherwise elicit responses from students, I would make use of cold call. Students expected that when I asked a question, I would call on a random student helping to keep engagement up and setting a routine for students to expect. However if a student was very shy, I would not force them to participate in cold call. Instead there were other routines in place to allow these students to

participate. Often times this would mean that during individual work I would ask them a question that they could answer for me without needing to speak up in front of the entire class. When students did answer a question, whether they answered it correctly or not I would point out the positive aspect of their answer. For instance I might have said "thank you, that was a nice explanation," or if a student was unable to answer correctly I might have said, "Good point, it does seem like that should be the answer, but....," and use that as a learning opportunity. One of the most common things though would be for students to skip a step in the work, because often they could see where we were going in the material, but may have been unsure of how to get there. In this case I would often let them know they were close, ask another student to fill in the gap, then point out how that first student was correct and thank them for their answer from earlier. In this way during teacher centered activities students would feel that their ideas and opinions were being respected.

If the activity was student centered, then students knew that they were always welcome to discuss a problem with another student except during formal assessment. This meant that even when something was introduced as individual work, there would often be a low hum of student voices as some may be asking others questions. If the work was meant for groups, then except in the activities where students could get out of their seats such as with SUHUPU, they already knew who they would be working with. The groups were determined by who the student was sitting next to, since the classroom was too small to rearrange thirty-five students most of the time. This meant that the seating chart that the teacher created was very important in that it organized which students would interact with one another. During group work students knew that they would either work with students that sat beside them or behind/in front of them, and depending on the activity it may have been both.

Finally there is the matter of discipline. Classroom expectations had been clearly laid out by my mentor teacher, so that students knew what behavior was acceptable or not. If a student chose to break these norms, then my first disciplinary action was to talk to them individually and remind them that they were being disrespectful not only to me, but to the other students in the classroom. If the behavior



continued then the student could be sent out of the classroom. This is an action that the math department as a whole had decided on as the best way to discipline unruly students in class. What the department and myself found was that students took this very seriously, and as soon as one student was sent from the room, any other students who may have been disrespectful before tend to behave and stay focused after their peer is sent from the classroom. These students who are asked to leave are sent to a neighboring classroom, and as such my class received a few visitors. The way that the teachers send students, it is to a classroom with non-peers. In this way they do not disrupt the new class, which is what I found when freshmen were sent into my class of juniors and seniors. If student behavior becomes too unruly to handle then students are sent to the Vice Principal's office. I never experienced this situation though.

In this way students would know what to expect whether the activity was teacher centered or student centered. Further there were clear expectations on classroom behavior, so that students would know why they were being disciplined and what to expect as a consequence of their action. These routines and classroom habits gave students a strong idea of what to expect in the classroom, and further encouraged their curiosity and academic bravery. As a teacher the goal was to continue reinforcing these behaviors so that students could feel comfortable enough to learn the lessons that were being taught, and to go beyond the material for a deeper understanding.

## High Expectations

High expectations means that students are expected to do well in class even if they are struggling in the material. Rather than "accept" that a student cannot learn something, a teacher continues to demonstrate how difficulties can be overcome, and the different skills that students can develop to help them attain mastery of the material. This includes carefully presenting the mathematics so that it does not seem magical or bizarre to the students, but in a way that they can see where each step comes from. Further it means helping students develop the study skills they need to prepare for a quiz or test.

Whenever I introduced new material, I would organize the material in such a way that students could see how it related to mathematics they had previously been taught. For instance when introducing the idea of sine and cosine on the unit circle, we began the lesson with review of special right triangles. This is something that the student had mastered a couple years ago in geometry class. Then we used this to derive what the sine angle of  $\frac{\pi}{4}$ , or  $45^\circ$ , was on the unit circle. In this way the goal was to show students some of the intuition behind sine and cosine, so that as they were learning it, they could see how it related to other concepts they were already familiar with.

Further, as example problems were gone over, I would carefully reason everything out loud while writing it on the board. This vocalization of the material would help students understand the kind of critical thinking necessary to solve a problem like what we were learning about. In this way they could continue to see where the mathematics behind what they were learning came from. To further reinforce this idea I would also color code the work on the board. This way if we were making use of a new formula or definition, students could see exactly where that was happening. Color was also used to differentiate between different types of problems. For example while teaching the logarithms unit, if a problem made use of the product rule it would be in one color, the quotient rule another color, and if it used the power rule it would be in a third color. This way the students could relate the abstract formula to an example more easily.

Another important aspect of high expectations is helping students develop the tools to understand material that they find challenging. Often times this was the goal of the activity on Thursday that our class completed. Such as the use of practice problems as a way to prepare for quizzes and tests. Often times Thursday would include group work as a reminder that one's peers can be a great resource in one's studies. We also discussed things such as toolboxes as a way of organizing information. Then by giving students an index card they could bring to the test or quiz, if it was appropriate, it taught students that condensing one's notes and reviewing the major concepts of the class can be a very beneficial way to study the material. When an index card was inappropriate for students to use, such as when they memorized the unit circle, the class

would make use of videos and songs to help them remember. We even discussed in class one day how playing online games can help one study, such as The Unit Circle game which can be found on [purposegames.com](http://purposegames.com). This game helps student quickly practice the angles as well as the coordinate points on the circle, both things they were going to be tested on, with immediate feedback. In this way a variety of tools were introduced to students to help them master material, despite any struggles they may originally have had.

High expectations means believing in all of your students. Despite struggling every student has the ability to learn and master new material. As a teacher it is our job to give students the proper tools to attain that mastery. In this way material is presented in a way that allows students to see the thought process behind, and the kinds of skills necessary to achieve mastery of the material. Further, the teacher may introduce tools that students can access outside of the classroom to help further their education. Finally teachers are available after school to help students if they are struggling and feel they need extra help. All of these routines and structures were created to make learning more accessible to everyone.

## Reflective Practice

No teacher is going to be perfect one hundred percent of the time, and what this means is that teachers always have room to improve. The best way to go about this is through reflective practice. Teachers reflect in a variety of ways. This means they spend time contemplating on their own what went well and what did not, as well as discussing with other teachers opportunities for growth. As a student teacher I had the further resources of my mentor teacher who was able to observe my teaching style regularly, as well as the other student teachers that I studied with.

At the end of every school day one of the first things I did was record the hours I had completed that day. While recording these hours I also had space in my chart to write notes about any troubles that I had in

the classroom, as well as any triumphs. In this way I could better reflect on my growth and progress throughout my time as a teacher, because I would have specific events to look back on. Then at the end of the week I would use that log to write a journal reflection. This journal included a high of the week, a low of the week, a goal for the upcoming week, and an evaluation of how my previous weekly goal had gone. Then I also had a different question to answer each week, such as "Describe a lesson that you observed. How did the teacher introduce, progress through, and wrap-up the lesson?" or "Describe the importance of using a variety of measurements to assess and promote student learning. How do these assessments change over time?" These journals can be found attached in the appendices as well as some of the hour logs that I used. Further, I would review my lesson plan for that day and annotate any changes I wanted to make to it. Perhaps I noticed that my pacing was very off, or that I forgot to review a background concept, then I would make note of it in the lesson plan. In this way if I taught the lesson again, which I did in the case of lessons I taught honors, and then college level precalculus a few weeks later.

Along with individual reflection I would also discuss different teaching strategies and especially discipline strategies with other teacher. Discipline is what I felt I needed to work on the most in my classroom, as I had one class that often tried to talk over me. What I had found difficult was pinning down which student I should choose to punish, and in my indecision no student would be punished. What the teachers told me was that it was less important to be fair to each individual than to the classroom as a whole. In many different experiences they found that it was impossible to be perfectly fair, but that to allow continued misbehavior was unacceptable in the classroom. The advice I received was to put the classroom as a whole ahead, because often times these things will even out over time. The advice that I received that I immediately used afterwards, was that when I noticed an unacceptable behavior, to simply choose the next person to participate. In this way I do not have to play a guessing game of who started it, and I also create a culture that does not promote student misbehavior because other students will be less likely to join in if they could be the ones who get punished for the action.

As a student teacher my mentor teacher was another great resource. She was very familiar with the group dynamic of the students since it was her classroom. It was always very reassuring to hear that certain behaviors were normal, if unpleasant, and that student involvement was going very well. Even if these things did not seem to be the case while I was teaching. My mentor teacher was very supportive of the learning process, and was especially helpful in teaching me how to pace the classes well to keep up with the scope of the class without moving so fast that most of the students gave up. Every morning my mentor teacher and I would discuss the lesson plan for the day, and at the beginning of the week we would discuss the objectives that would be tested that Friday. In this way I was able to reflect on the structure of my classes, and how best to manage time on a regular basis.

Finally, each week I would meet with my peers, other student teachers who were working at the high school level. This is where we would have a chance to discuss our weekly journals with others who were experiencing a similar learning process. In this way we were able to learn from one another, and discuss the different strategies we had found useful for assessment, classroom expectations, and lesson planning. By having the same journal question, and having it change each week, we always had plenty to discuss about the classroom. I also would carpool with another student teacher each day, so that in the car ride to and from the school, we were able to discuss and reflect on daily activities as well, even if it was just dealing with a college course on top of student teaching.

In this way I had many different ways to reflect on my time as a teacher. On a daily basis I would reflect on how I personally thought I had done in the classroom, then use those ideas to discuss with other teachers how they dealt with these types of problems. Reflecting on the job I was doing as a teacher allowed me to continually improve for my students, and grow as a professional.

## Worcester Polytechnic Institute Education

WPI offers an education to potential teachers that is content based. Students are taught to think critically about their time in the classroom and about different strategies in very important classes. One of these classes is called Teaching Methods in Mathematics and Science, and this class goes over wide background of skills, especially including what an IEP form is and how to accommodate it. The other course is called Sheltered English Immersion (SEI) and is a class that helps students develop skills to meet the diverse needs of English Language Learning (ELL) students from all over the world. This is especially important since Worcester as a refugee center has a higher concentration of ELL students than most places in the United States. All of these things prepared me for my time in the classroom.

At WPI I am a Mathematical Sciences major. This means that I have been taught things like Differential Equations, Real Analysis, Group Theory, and Linear Programming, all things that most high school students have not even heard of. Having this kind of mathematical background does not always directly relate to what students are learning in the high school classroom, but it does mean that I am very comfortable working with the mathematics. If a student has a question about “why?” I am able to answer it. This deeper understanding of concepts that students are being taught also means that I can present the material in a way that easily relates it to previously learned concepts and shows the interrelation between what students are learning, such as discussing the importance and usefulness of  $\sin(x)$  having an oscillatory function with a bounded range.

A very important course that students who wish to be student teachers must take and pass their sophomore year at WPI is Teaching Methods for Mathematics and Science. This course teaches students different strategies for maintaining student engagement during and beyond a lecture style of engagement in the classroom. There were a wide variety of methods, but cold call was the one that I made the most use of. This is a strategy that lays out how to call on a student to answer a question without them raising their hand in such a way that the other students are still thinking about the problem and that the student feel less

singled out. One does this by asking the question, pausing, then calling on a random student and asking the question again. It is especially useful if the teacher decides to not choose randomly, but instead choose a student who looks like they are no longer listening. It is in this way a great way to check that students are learning all of the material they need to master. Another strategy that was discussed is called wait time, where the teacher asks a question and then pauses until more students raise their hands with the answer. This strategy is meant to ensure that a teacher is not always calling on the same few students, which allows others in the class to no longer think critically about the material.

The Teaching Method course also spent time going over what an IEP form is, and how to accommodate students with them. We learned in this class that a student with an IEP could range from a student needing glasses, so that if they forget their glasses they need to be able to sit in the front of the class, to students with learning disabilities such that they need repeated directions, extra time to copy notes, as well as extra time to complete assignments including formal assessment. We further discussed how to accommodate these students as a teacher, and were asked to do critical thinking and writing exercises on the subject multiple times throughout the course. In this way by the time I arrived in a classroom I was prepared for the special education population that I may find in the class, and felt very comfortable accommodating students in a way that did not bring unnecessary attention to their needs.

One of the most powerful things about the Teaching Methods course was how the professors in charge of the course were actually the department heads of mathematics and science at Doherty High School. This meant we were being taught different strategies by two teachers who were accomplished in their field and could speak beyond their own classroom even as they also had the job of evaluating other teachers in the school. These teachers also made great use of their experience. As a class and as student teachers, teaching a prepared lesson to the other students in the class who pretended they were in high school, we were asked to brainstorm and deal with specific situation that were difficult, yet seen by the two teachers in their classes quite often. One example was of a student who could not sit still in class, but instead

would constantly get up to throw something away. Another example was of a student who was constantly dropping her pen to the point of distracting other students. In this way we as students were able to glean some real world examples of what it meant to be a student teacher.

The other course that WPI offers to student teachers is the SEI course. SEI is designed to teach the student teachers how to scaffold a lesson and how to accommodate the needs of ELL students in such a way that the rest of the class benefits. Some strategies that we were reminded of were repetition, using written and verbal instruction, and speaking more slowly and emphasizing the most important concepts. One of the most challenging aspects of SEI is how the teacher of a content area like mathematics was supposed to help develop the language skills of an English Language Learning student. Through work in this class it made teaching the diverse needs in a classroom more accessible to the student teachers. We discussed how there are four main areas of language development: listening, speaking, writing, and reading. We were taught that the best way to teach students these skills is to focus on only one area per lesson. This meant that if we needed to present new material then we may have the students work on their listening skills, and this is when earlier strategies become very helpful not only for ELL students but the class overall. Often in mathematics the reading skill would be worked on through the case of word problems, in which case as teachers we needed to carefully model how to get the information one needed from a word problem and turn it into mathematics. A class that was focused on group work would be focused on helping ELL students practice speaking skills. Writing skills was the most difficult to incorporate into a mathematics course our group thought, but during the course of SEI we were reminded that students can be given homework assignments that have them practice writing skills.

These are all things that I brought with me into the classroom. In one instance this became especially useful since I noticed that not only were the ELL students struggling with writing and speaking skills regarding logarithms. Because I was focused on meeting diverse needs, I was able to see the need to incorporate how to read a logarithm into a lesson. This meant we went over that  $\log_a(b)$  is read "logarithm with base a of b,"



something most students had not known, and I had needed reminding of to teach them. Another thing I learned was that the best way to accommodate ELL students when having them practice English is to spend some extra time with them while walking around the classroom. In this way the students are not singled out and still receiving the extra help they need. This is something else that I made sure to implement in my classroom.

WPI's education is meant to prepare students for the classroom. As soon as one enters the Teaching Methods course or SEI course at WPI, one is taught how to make well-structured lesson plans about one's content. Further the structure of these classes asks one to reflect not only on one's own work during presentations, but also on helping other students develop their teaching skills, which allows the student teachers to learn from one another more easily as well while adjusting their practice. At WPI we are offered classes that give us specific strategies to help students learn and meet diverse needs, as each course focuses on helping student teachers understand how to meet special education and ELL students' needs while still engaging students who understand the material well. At WPI a safe learning environment is something that is modeled to me constantly by Professors, so that this was made even easier to discuss during the student teacher course work and incorporate into our own classrooms. Further, here at WPI we are used to maintaining high expectations, as our course work requires it of the student teachers as well. In this way we are teaching students not something abstract, but skills that have helped us through college and high school before. All of these things come together to help the student be well prepared by the time she steps into the classroom.

## My Classes at Doherty

I started student teaching at Doherty Memorial High School in January of 2016. This began with me observing my mentor teacher in the classroom and how she interacted with her class. After a month and a half I would

take over the classroom. To help prepare me I was in charge of taking attendance so that I could learn all of the student's names and on occasion I would act as a substitute teacher for the classroom if a school emergency arose or my mentor teacher as Department Head was called away from the classroom. In this way the students and I were able to get to know each other before I took over teaching them. Further I was able to observe the pace that the class moved in, the kinds of strategies that worked well for students, and the norms of the classroom. All of this was meant to prepare me for my transition to teacher at the head of the classroom.

Once I took over as teacher, the norms in the classroom remained the same and the students and I already knew each other's names. At this point I was acting teacher, where I developed the lesson plans, set the pace of the classroom, and chose which objectives to focus on for students to meet the state standards. I still received support from my mentor teacher as someone who would be able to answer all of my questions, help me better understand the classroom dynamics I was experiencing, and brainstorm how to keep students engaged in the lesson. The biggest difference between myself and a full time teacher to my students though, was only that I was not available to them for after school help.

## Conclusion

During my time at Doherty Memorial High School I was able to grow immensely as a teacher. My time before entering the classroom was spent preparing through coursework at WPI such as the Teaching Methods for mathematics and Science as well as Sheltered English Immersion Courses. Further, by having clear guidelines in what was expected of me as a teacher I could focus on developing the skills that were most relevant to students and their success in the classroom. These skills were well-structured lessons, adjustment to practice,

meeting diverse needs, developing safe learning environments, keeping high expectations, and using a reflective practice. All of these skills meant that I was continually challenging myself to improve as a teacher.

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# Classroom Activities

Stand Up Hand Up Pair Up (SUHUPU)

Expand

$$\log_7 77$$

1

Expand

$$\log_8 2/8$$

2

Expand

$$\log_2(4/(3^5))$$

3

Expand

$$\log_6 42$$

Expand

$$\log_y(5y)^5$$

Expand

$$\log_3 4^3$$

Expand

$$\log_3 9x^2$$

Expand

$$\log_{10} \sqrt{10g}$$

$\log_8 2 - \log_8 8$ $\log_8 8^{1/3} - \log_8 8$ $\frac{1}{3}(\log_8 8) - \log_8 8$ $\frac{1}{3} - 1 = -\frac{2}{3}$	$\log_7 7 + \log_7 11$ $\log_7 11 + 1$
$\log_6 6 + \log_6 7$ $\log_6 7 + 1$	$\log_2 4 - \log_2 3^5$ $\log_2 2^2 - 5(\log_2 3)$ $2(\log_2 2) - 5(\log_2 3)$ $2 - 5(\log_2 3)$
$3 \log_3 4$	$5 \log_y 5y$ $5(\log_y 5 + \log_y y)$ $5(\log_y 5 + 1)$ $5 \log_y 5 + 5$
$\log_{10} 10g^{\frac{1}{2}}$ $\frac{1}{2} \log_{10} 10g$ $\frac{1}{2}(\log_{10} 10 + \log_{10} g)$ $\frac{1}{2} + \frac{1}{2} \log_{10} g$	$\log_3 9 + \log_3 x^2 \text{ or } \log_3 (3x)^2$ $\log_3 3^2 + 2 \log_3 x \text{ or } 2 \log_3 3x$ $2 \log_3 3 + 2 \log_3 x \text{ or }$ $2(\log_3 3 + \log_3 x)$ $2 + 2 \log_3 x$

Expand

$$\log_{\pi} 3\pi^2$$

1

Expand

$$\log_{98} 7/t$$

2

Expand

$$\log_{12} x^2/82$$

3

Expand

$$\log_5 625$$

Expand

$$\log_8 6/64$$

Expand

$$\log_x 100/3x$$

Expand

$$\log_7 49/2$$

Expand

$$\log_{11} \sqrt[4]{6/7}$$



$\log_{98} 7/t$ $\log_{98} 7 - \log_{98} t$ 2	$\log_{\pi} 3\pi^2$ $2\log_{\pi} 3\pi$ $2(\log_{\pi} 3 + \log_{\pi} \pi)$ $2(\log_{\pi} 3 + 1)$ 1
$\log_5 625$ $\log_5 5^4$ $4\log_5 5$ 4	$\log_{12} x^2/82$ $\log_{12} x^2 - \log_{12} 82$ $2\log_{12} x - \log_{12} 82$ 3
$\log_x 100/3x$ $\log_x 100 - (\log_x 3 + \log_x x)$ $\log_x 100 - \log_x 3 - 1$	$\log_8 6/64$ $\log_8 6 - \log_8 64$ $\log_8 6 - \log_8 8^2$ $\log_8 6 - 2$
$\log_{11} \sqrt[4]{6/7}$ $\frac{1}{4}(\log_{11} 6/7)$ $\frac{1}{4}(\log_{11} 6 - \log_{11} 7)$	$\log_7 49/2$ $\log_7 7^2 - \log_7 2$ $2\log_7 7 - \log_7 2$ $2 - \log_7 2$

Condense

$$\log_5 t - \frac{1}{2} \log_5 4$$

Condense

$$\ln 28 - \ln 7$$

Condense

$$\log_7 21 - 1$$

Condense

$$\ln 8 + \ln y - 2 \log 5$$

Condense

$$1000 \log_3 1 - \log_3 2$$

Condense

$$\pi (\log_y 4 + 1)$$

Condense

$$\log_4 2 - \log_4 6 + \log_4 3$$

Condense

$$\frac{1}{4} \log_3 16 - 3 \log_3 2$$

$\ln 28 + \ln \frac{1}{7}$ $\ln \frac{28}{7}$ $\ln 4$	$\log_5 t - \frac{1}{2} \log_5 4$ $\log_5 t - \log_5 \sqrt{4}$ $\log_5 t - \log_5 2$ $\log_5 \frac{t}{2}$
$\ln 8 + \ln y - 2 \log 5$ $\ln 8y - \log 5^2$	$\log_7 21 - 1$ $\log_7 21 - \log_7 7$ $\log_7 21/7$ $\log_7 3$
$\pi (\log_y 4 + 1)$ $\pi (\log_y 4 + \log_y y)$ $\pi (\log_y 4y)$ $\log_y (4y)^\pi$	$1000 \log_3 1 - \log_3 2$ $\log_3 1^{1000} - \log_3 2$ $\log_3 1 - \log_3 2$ $\log_3 \frac{1}{2}$
$\frac{1}{4} \log_3 16 - 3 \log_3 2$ $\log_3 \sqrt[4]{16} - \log_3 2^3$ $\log_3 2 - \log_3 2^3$ $\log_3 \frac{2}{2^3}$ $\log_3 \frac{1}{4}$	$\log_4 2 - \log_4 6 + \log_4 3$ $\log_4 2/6 + \log_4 3$ $\log_4 6/6$ $\log_4 1$ $0$

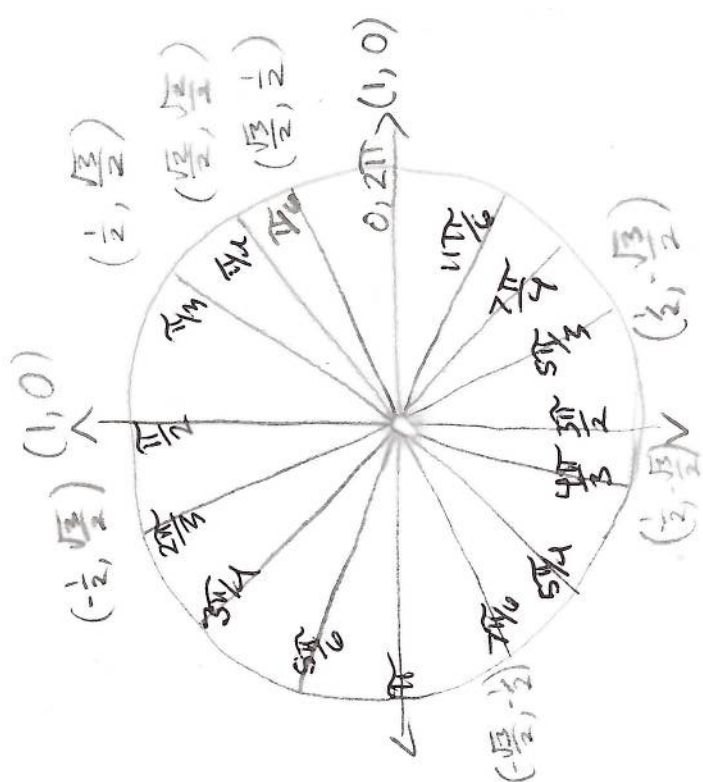
<p>Condense</p> $\log_3 6 + 4 \log_3 2$	<p>Condense</p> $-\log_9 2 - \log_9 2$
<p>Condense</p> $4(\log_2 3 + 1)$	<p>Condense</p> $\log_6 u - \log_6 8$
<p>Condense</p> $6 \log_{13} 5 - \log_{13} x$	<p>Condense</p> $\log_2 4 + 2 \log_2 2$
<p>Condense</p> $\frac{1}{2} \log_4 4 - 3 \log_4 2$	<p>Condense</p> $8(\ln 3 - \ln 6)$

$  \begin{aligned}  & -\log_9 2 - \log_9 2 \\  & -2\log_9 2 \\  & \log_9 \frac{1}{2^2} \\  & \log_9 \frac{1}{4}  \end{aligned}  $	$  \begin{aligned}  & \log_3 6 + 4 \log_3 2 \\  & \log_3 6 + \log_3 2^4 \\  & \log_3 (6 * 2^4)  \end{aligned}  $
$  \begin{aligned}  & \log_6 u - \log_6 8 \\  & \log_6 \frac{u}{8}  \end{aligned}  $	$  \begin{aligned}  & 4(\log_2 3 + 1) \\  & 4(\log_2 3 + \log_2 2) \\  & 4 \log_2 6 \\  & \log_2 6^4  \end{aligned}  $
$  \begin{aligned}  & \log_2 4 + 2 \log_2 2 \\  & \log_2 2^2 + 2 \log_2 2 \\  & 2 \log_2 2 + 2 \log_2 2 \\  & 2 + 2 \\  & 4  \end{aligned}  $	$  \begin{aligned}  & 6 \log_{13} 5 - \log_{13} x \\  & \log_{13} 5^6 - \log_{13} x \\  & \log_{13} 5^6 / x  \end{aligned}  $
$  \begin{aligned}  & 8(\ln 3 - \ln 6) \\  & 8(\ln \frac{3}{6}) \\  & 8 \ln \frac{1}{2} \\  & \ln(\frac{1}{2})^8  \end{aligned}  $	$  \begin{aligned}  & \frac{1}{2} \log_4 4 - 3 \log_4 2 \\  & \log_4 4^{1/2} - \log_4 2^3 \\  & \log_4 2 - \log_4 8 \\  & \log_4 2/8 \\  & \log_4 1/4 \\  & \log_4 4^{-1} \\  & -1  \end{aligned}  $

Trig Book

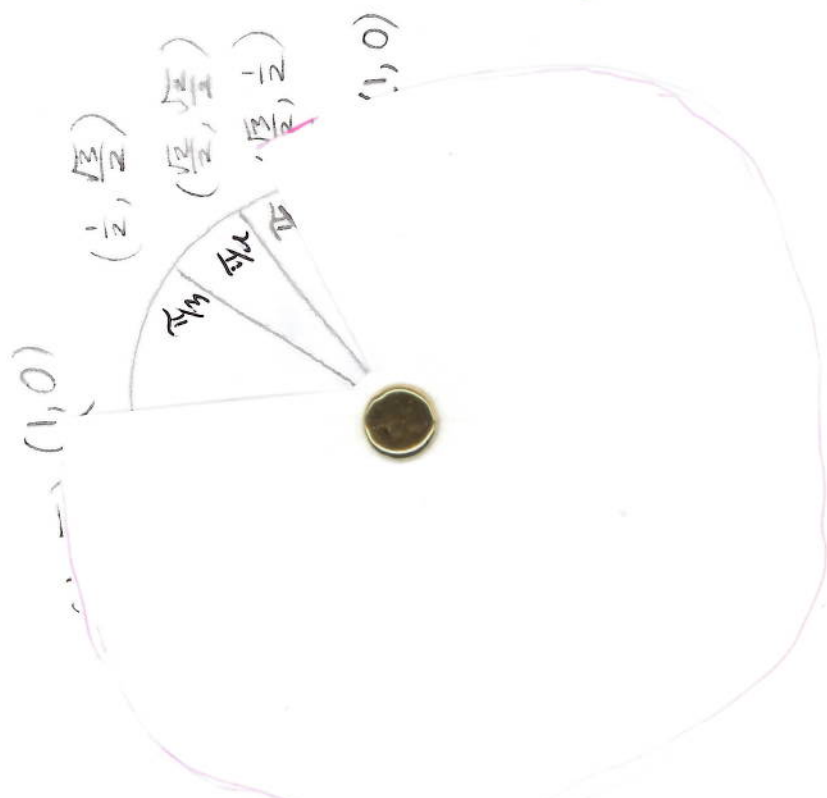
# Trig Book

degrees	radius	$\sin(\theta)$	$\cos(\theta)$	$\tan(\theta)$	$\csc(\theta)$	$\sec(\theta)$	$\cot(\theta)$
30°	$\pi/6$	$1/2$	$\sqrt{3}/2$	$\sqrt{3}/3$	2	$2\sqrt{3}/3$	$\sqrt{3}$
45°	$\pi/4$	$\sqrt{2}/2$	$\sqrt{2}/2$	1	$\sqrt{2}$	$\sqrt{2}$	1
60°	$\pi/3$	$\sqrt{3}/2$	$1/2$	$\sqrt{3}$	$2\sqrt{3}/3$	2	$\sqrt{3}/3$
90°	$\pi/2$	1	0	und.	1	und.	0
120°	$2\pi/3$	$\sqrt{3}/2$	$-1/2$	$-\sqrt{3}$	$2\sqrt{3}/3$	-2	$-\sqrt{3}/3$
135°	$3\pi/4$	$\sqrt{2}/2$	$-\sqrt{2}/2$	-1	$\sqrt{2}$	$-\sqrt{2}$	-1
150°	$5\pi/6$	$1/2$	$-\sqrt{3}/2$	$-\sqrt{3}/3$	2	$-2\sqrt{3}/3$	$-\sqrt{3}$
180°	$\pi$	0	-1	und.	und.	-1	und.
210°	$7\pi/6$	$-1/2$	$-\sqrt{3}/2$	$\sqrt{3}/3$	-2	$-2\sqrt{3}/3$	$\sqrt{3}$
225°	$5\pi/4$	$-\sqrt{2}/2$	$-\sqrt{2}/2$	1	$-\sqrt{2}$	$-\sqrt{2}$	1
240°	$4\pi/3$	$-\sqrt{3}/2$	$-1/2$	$\sqrt{3}$	$-2\sqrt{3}/3$	-2	$\sqrt{3}/3$
270°	$3\pi/2$	-1	0	und.	-1	und.	0
300°	$5\pi/3$	$-\sqrt{3}/2$	$1/2$	$-\sqrt{3}$	$-2\sqrt{3}/3$	2	$-\sqrt{3}/3$
315°	$7\pi/4$	$-\sqrt{2}/2$	$\sqrt{2}/2$	-1	$-\sqrt{2}$	$\sqrt{2}$	-1
330°	$11\pi/6$	$-1/2$	$\sqrt{3}/2$	$-\sqrt{3}/3$	-2	$2\sqrt{3}/3$	$-\sqrt{3}$
360°	$2\pi$	0	1	und.	und.	1	und.





degrees	rad:ans	$\sin(\theta)$	$\cos(\theta)$	$\tan(\theta)$	$\csc(\theta)$	$\sec(\theta)$	$\cot(\theta)$
30°	$\pi/6$	$1/2$	$\sqrt{3}/2$	$\sqrt{3}/3$	2	$2\sqrt{3}/3$	$\sqrt{3}$
45°	$\pi/4$	$\sqrt{2}/2$	$\sqrt{2}/2$	1	$\sqrt{2}$	$\sqrt{2}$	1
60°	$\pi/3$	$\sqrt{3}/2$	$1/2$	$\sqrt{3}$	$2\sqrt{3}/3$	2	$\sqrt{3}/3$
90°	$\pi/2$	1	0	$\frac{1}{0} = \text{und.}$	1	$\frac{1}{0} = \text{und.}$	0
120°	$2\pi/3$	$\sqrt{3}/2$	$-1/2$	$-\sqrt{3}$	$2\sqrt{3}/3$	-2	$-\sqrt{3}/3$
135°	$3\pi/4$	$\sqrt{2}/2$	$-\sqrt{2}/2$	-1	$\sqrt{2}$	$-\sqrt{2}$	-1
150°	$5\pi/6$	$1/2$	$-\sqrt{3}/2$	$-\sqrt{3}/3$	2	$-2\sqrt{3}/3$	$-\sqrt{3}$
180°	$\pi$	0	-1	0	und.	-1	und.
210°	$7\pi/6$	$-1/2$	$-\sqrt{3}/2$	$\sqrt{3}/3$	-2	$-2\sqrt{3}/3$	$\sqrt{3}$
225°	$5\pi/4$	$-\sqrt{2}/2$	$-\sqrt{2}/2$	1	$-\sqrt{2}$	$-\sqrt{2}$	1
240°	$4\pi/3$	$-\sqrt{3}/2$	$-1/2$	$\sqrt{3}$	$-2\sqrt{3}/3$	-2	$\sqrt{3}/3$
270°	$3\pi/2$	-1	0	und.	-1	und.	0
300°	$5\pi/3$	$-\sqrt{3}/2$	$1/2$	$-\sqrt{3}$	$-2\sqrt{3}/3$	2	$-\sqrt{3}/3$
315°	$7\pi/4$	$-\sqrt{2}/2$	$\sqrt{2}/2$	-1	$-\sqrt{2}$	$\sqrt{2}$	-1
330°	$11\pi/6$	$-1/2$	$\sqrt{3}/2$	$-\sqrt{3}/3$	-2	$2\sqrt{3}/3$	$-\sqrt{3}$
360°	$2\pi$	0	1	0	und.	1	und.



# Graphs

$$\sin(x) = y$$
$$\csc(x) = \frac{1}{y}$$

+	+
-	-

$$\cos(x) = x$$
$$\sec(x) = \frac{1}{x}$$

+	+
-	-

## Graph Transformations

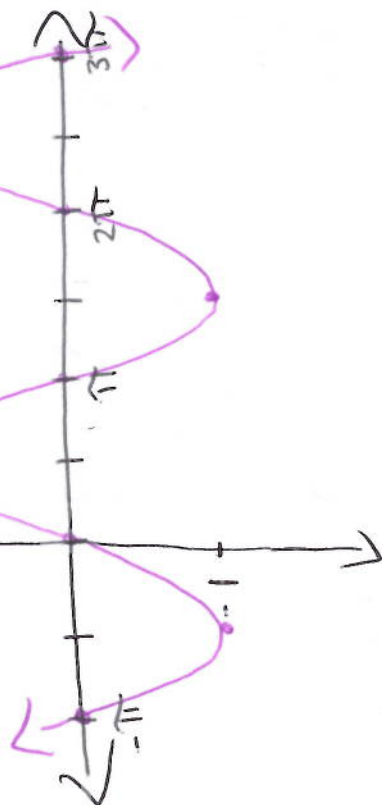
Reflection;

Translation;

Stretching;

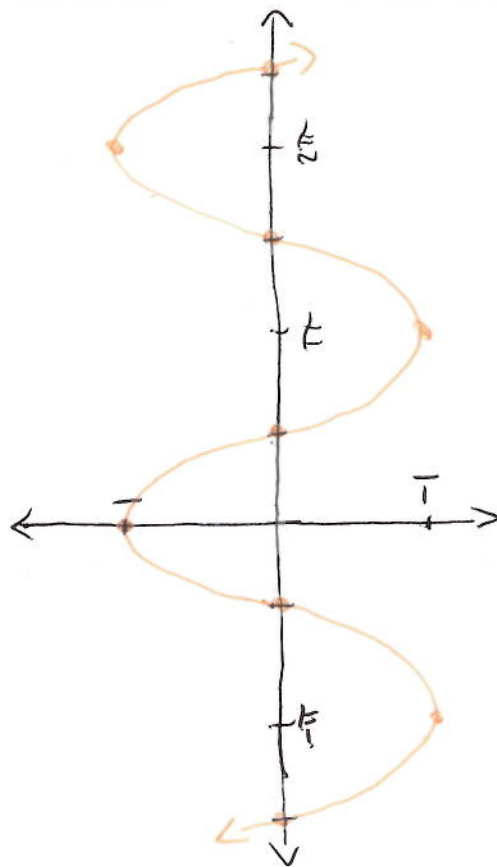
$\sin(x)$

$y$	0	1	0	-	0	1	0
$x$	$\pi$	$\pi/2$	0	$\pi/2$	$\pi$	$3\pi/2$	$2\pi$

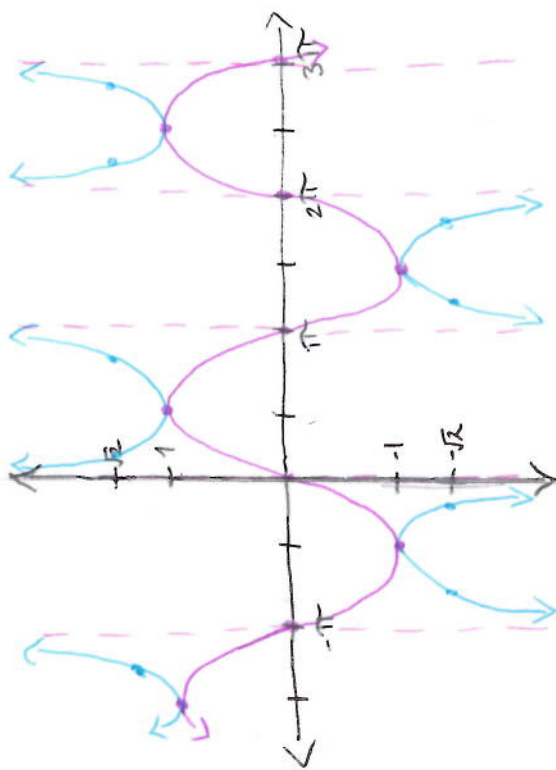


$\cos(x)$

$y$	1	0	-1	0	1
$x$	0	$\pi/2$	$\pi$	$3\pi/2$	$2\pi$

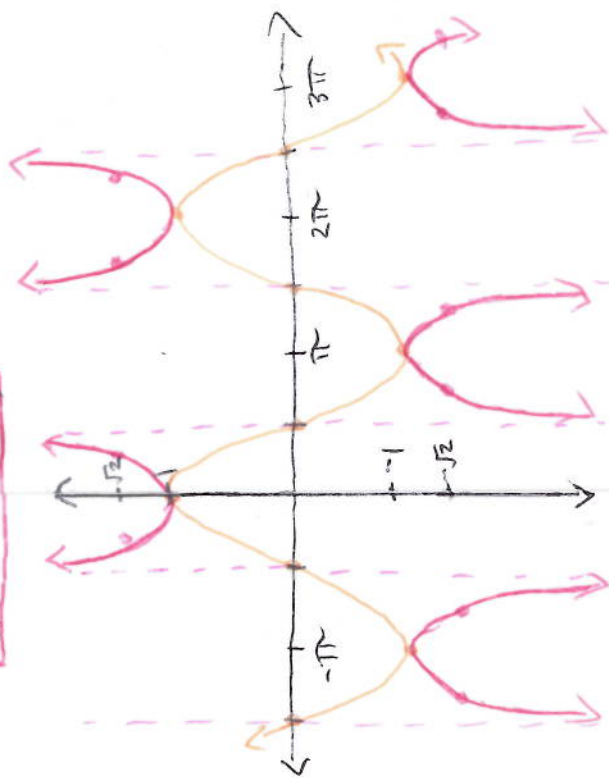


$\csc(x)$



$x$	$y$
$0$	und.
$\pi/4$	$\sqrt{2}$
$\pi/2$	$1$
$3\pi/4$	$\sqrt{2}$
$\pi$	und.
$5\pi/4$	$-\sqrt{2}$
$3\pi/2$	$-1$
$7\pi/4$	$-\sqrt{2}$
$2\pi$	und.

$\sec(x)$



$x$	$y$
$-\pi/2$	und.
$-\pi/4$	$\sqrt{2}$
$0$	$1$
$\pi/4$	$\sqrt{2}$
$\pi/2$	und.
$3\pi/4$	$-\sqrt{2}$
$\pi$	$-1$
$5\pi/4$	$-\sqrt{2}$
$3\pi/2$	und.

## Lesson Plans

### PreCalculus Level One (Period 3 and 6)

- Week of Feb. 29th: Solving Exponential and Logarithmic Equations
- Week of March 7th: Exponential and Logarithmic Models
  - (do not go over Gaussian vs. Logistic Models) Just go over solving for “t” in compound interest problems, growth and decay problems using the formula  $y = ae^{kt}$ , the book uses r instead of k.
  - See example 2 on pg. 223 and example 3 on pg. 224 and example 5 on pg. 226
  - Select homework problems similar to those example
- Week of March 14th: 4.1
- Week of March 21st: Review Special Right triangles.
  - Monday 45-45-90 (HW worksheet)
  - Tuesday 30-60-90 (HW worksheet)
  - Wednesday Convert Radians to Degrees and Visa Versa and Derive Ordered pairs of unit circle using special right triangles (Quadrant I) They can fill out quadrant 2 for homework
  - Thursday Unit Circle PowerPoint and finish notes on Quadrant III and IV
  - **No School Friday (Good Friday)**
- Week of March 28 (Spend all week on this section)
  - Evaluating angles on the unit circle
  - Have students memorize unit circle
  - Plan activities around this evaluation
  - Assign homework problems (in book or supplemental material) that do not require a calculator
- Week of April 4: Chapter 4.3
- Week of April 11: Chapter 4.4
- **Vacation Week of April 18th**
- Week of April 25th: 4.5 Graphs of Sine and Cosine
  - Each day introduce something new. Monday amplitude, Tuesday period, etc;
- Week of May 2nd: Graphs of Other Trig Functions
  - Remind me to show you how I teach the graphs of cosecant and secant
- Week of May 10th: **Review for Final Exam** We can discuss review in April
- Week of May 17th: **Final Exams for Seniors**
- **May 23 last day for seniors, May 27 last day for you :(**

## PreCalculus Level Honors (Period 4)

- Chapter 4
  - Unit Circle
  - Solving for trig ratio, with angles on and not on the unit circle
  - odd and even trig ratios (we studied odd and even functions already in the beginning of the year)
  - Applications (word problems)
  - Constructing (without the aid of a calculator) sine and cosine waves over 2 periods
  - Focus on sine and cosine the most.
  - Show them how to derive the cosecant and secant graphs from the sine and cosine graphs (**I can show you how to do this**)
  - SKIP the DAMPING of graphs section in the text
  - Inverse Trig functions
    - Spend some time here to ensure mastery
    - Focus on domain and range
- Chapter 5
  - 5.1 Fundamental Identities
  - 5.2 Verifying Identities
  - 5.3 Solving Trigonometric Equations
  - 5.4 Sum and Difference Formula (they should know the sine and cosine, and just be exposed to the tangent one)
  - 5.5 Multiple Angles (just the double angle and no product to sum formula)
- Chapter 6
  - Law of Sine
  - Law of Cosine

## Section 3.3

Do now:  $-8.125$

A number  $n$  is increased by  $8$ . If the cube root of that result equals  $-0.5$ , what is the value of  $n$ ?

**The logarithm is the Exponent!** (that's why these rules work)

**Lesson plan:**

*\*Be sure to both expand and contract*

Product Rule -  $\log_a(u \cdot v) = \log_a(u) + \log_a(v)$

- $\log_3(9) = \log_3(3) + \log_3(3)$
- $\log_5(25y) = \log_5(25) + \log_5(x)$
- $\log_{\pi}(2\pi) = \log_{\pi}(2) + \log_{\pi}(\pi)$

Quotient Rule -  $\log_a(u/v) = \log_a(u) - \log_a(v)$

- $\log_2(1/2) = \log_2(1) - \log_2(2)$
- $\log_6(w/36) = \log_6(w) - \log_6(36)$
- $\log_e(28/e) = \ln(28) - \ln(e)$

Power Rule -  $\log_a(u^n) = n \cdot \log_a(u)$

- $\log_9(83) = 3 \cdot \log_9(8)$
- $\log_x(x^7) = 7 \cdot \log_x(x)$
- $\log_8(64452) = 452 \cdot 2 \cdot \log_8(8)$

**Challenge Question: Explain to me why the Power Rule works**

**Activity:**

Stand up Hand up Pair up: called Properties of Logarithms (in desk drawer)

To SUHUPU:

- listen to all of the directions, then begin
- Stand up
- Put your hand up like you are giving a high five
- Find someone to give a high five, this is your partner
- The person closest to the clock starts first. Answer the question on your partner's card. If you get stuck, the answer is on the back, your partner should explain what to do using the name of the rule being applied.
- Now the other person answers your question and you can help if they get stuck
- Trade cards
- Put your hand up and find a new partner!
- Teacher walks around, helping

**Homework:**

pg.207 47-55 odds and 71-81 odds



## Section 3.4

### Do Now

Expand:  $\log_y((5^t)^4) = 4(\log_y(5) + \log_y(t))$

Collapse:  $\log_3(45) - 2\log_3(5) = \log_3(9) = 2$

### Lesson Plan:

Inverse: definition of inverse (x, y table for  $2^x$ )  
composition of inverses

What is the inverse?

- $e^x$
- $78234^x$
- $\log_{43.1}(x)$
- $\log_a(x)$

Leads to one-to-one

- $2^x = 2^3$
- $5.2^{34} = 5.2^y$
- $\log_y(9) = 6$
- $\log_5(4.2) = \log_5(t)$

Worksheet for rest of class, students may work with neighbors

Homework:

pg.217 30-42 even and 93-99 odd

### Review Day: Calculators

Go over homework, have students do a few practice problems, then pass out calculators

Change of Base Formula :  $\log_a(b) = \frac{\log(b)}{\log(a)}$

- $\log_7(28) = \frac{\log(28)}{\log(7)}$  and  $\frac{\ln(28)}{\ln(7)}$
- $\log_9(3) = \frac{\log(3)}{\log(9)}$  and  $\frac{\ln(3)}{\ln(9)}$
- $\log_4(5e^2) = \frac{2(\log(5) + \log(e))}{\log(4)}$  and  $\frac{2(\ln(5) + \ln(e))}{\ln(4)}$

Class works on problems 93-106 pg.208 with the calculator

### Homework

Review for test

Also bring something to keep yourself quiet and entertained when you finish.

## Section 4.1

\*Since review do one example rather than many, and have them work in books more

**Do Now:** (7 min: 5 min to work; 2 min to go over)

Solve for x:

1)  $(st)/h * x = d$  dh/st

2)  $(t4h5uy3)/(t3h6u4y) * x = (ty2)/(hu2)$  1

\*While they work check hw and take attendance

The idea is that it is hard to memorize how to convert to all of the many different things, but working off of what units you have and where you want to go, you can usually figure it out with a good old ratio.

**Lesson Plan:** (35 min)

### 1. Start with how to read an angle: (5 min)

initial side: where you start

terminal side: where you end basketball analogy?

vertex: the pivot point

In general we read angles counterclockwise, but the initial side is just where you start

standard position: the initial side lines up with the x-axis

(If we don't read counterclockwise is considered a negative angle)

- what is it called if it's not in standard position? Annoying!
- coordinates are your friend, always set them up so you have the least amount of work

### 2. Practice with degrees (10 min)

Start by drawing 0, 90, 180, 270, and 360

What are some other angles I should draw? **(USE COLD CALL)**

45°, 135°, 225°, 315°, 30°, 60°

Examples in notebooks, each on own graph and leave space next to it (to be compared with neighbors and then used later in lesson):

\*Stop when about half class done, if students don't finish them all not a big deal

- 300 degrees
- 82 degrees
- 235 degrees
- 116 degrees

complementary: current angle and new positive angle add to 90° i.e. 30 and 60

supplementary: current angle and new positive angle add to 180° i.e. 60 and 120

coterminal angles: Has the same terminal side as your original angle (add or subtract 360°)

Really there are infinitely many angles, here we just want two of them

Answers for student problems

- none; none; 660° and -60°
- 8°; 98°, 442° and -278°
- none; none; 595° and -125°
- none; 64°; 476° and -244°

### 3. What are Radians? (15 min)

$\theta = s/r$  :  $\theta$  = angle  
 $s$  = arc length  
 $r$  = radius of the circle

- Do you guys have any idea what kind of units radians have? distance/distance, so none!!
  - (This is what makes radians the bomb-diggity)
- Not only that but do you think it's easier to measure the arclength of a circle or the angle measure?
  - Radians make that measurement so easy!! What can degrees do :P
  - All those are good for are cool trick names

Convert our reference graph on the board from degrees to radians. (I do 0 -  $2\pi$  by  $\pi/2$ )  
 See if the students can construct the conversion formula as a group:  $x^\circ \cdot \pi/180 = \text{radians}$

- How do we convert back to degrees?  $x \cdot 180/\pi = \text{degrees}$
- If the radius is one, what do we know about all of the arc lengths? They equal  $\theta$

I do a couple of examples on the board:

- $30^\circ = \pi/6$
- $220^\circ = 11\pi/9$
- $\pi/12 = 15^\circ$
- $3\pi/7 = 540/7^\circ$  or  $77.143^\circ$

I ask the students to convert the previous examples in their notebooks to radians.

- $300^\circ = 5\pi/3$      •  $\pi/4 = 45^\circ$
- $82^\circ = 41\pi/90$      •  $4\pi/3 = 240^\circ$
- $235^\circ = 47\pi/36$      •  $19\pi/9 = 375^\circ$
- $116^\circ = 29\pi/45$      •  $6\pi/13 = 1080/13^\circ$  or  $83.077^\circ$

**HW:** pg. 261 odds(25, 43, 47-53, 57-63, 81-83, 93-99)

If extra time reveal how cosine's name comes from how it is the compliment of sine in a right triangle!

### Review of Topics in Lesson:

- initial side, vertex, terminal side
- coordinate system
- coterminal and supplementary angles
- what is a radian?  $\Phi = s/r$  ( $s$ = arclength,  $r$ =radius length)
  - no units, they cancel
- That's why we like the unit circle!
- converting to and from radians and degrees

## Section 4.5

Time Frame: 2 days! (This was very optimistic...)

Students will be able to:

- graph sin, cos, and tan
- recognize, identify, and record the amplitude and period
- translate functions horizontally and vertically

Do Now1:

Same as PreCalc College (sec 3.3)

Do Now 2:

What is the amplitude and period of  $6(7/8 \sin(\pi x))$

Lesson Plan:

- graph sin  $[0, 3\pi]$  by  $\pi/4$
- patterns?
- Range is so super cool!!!!!! oscillation and all things bounded
- Show video: <https://www.youtube.com/watch?v=2LK7vcSR9Zs>
  - What are some other things that can be represented by sin?
    - earthquake
    - cow in a tornado
    - ocean
    - plyometrics class
- graph cos, how relate to sin?

\*self-discovery

- Pass out graphing calculators and have students mess around with  $d+a\sin(bx-c)$ 
  - What does changing a, b, c, d do to the sin function?
  - Do the same for cos
- Amplitude: the height from the mean, or rest, value of the function to its maximum or minimum.
  - $c f(x) = |c|$
- Period: the distance required for the function to complete one full cycle
  - $f(cx) = (2\pi)/c$
- horizontal and vertical translations  $f(x+c)$  and  $c+f(x)$

Activity:

Using graphing calculators discover how  $d+a\sin(bx-c)$  changes the original function  
**10 min**, Then we discuss as a class

Analyze:  $-1/2\sin(\pi x - \pi)$ : amplitude, period, cycle domain: intercepts, min and max  
do number 21 in class on pg. 299 (shift right, because reaching to the left and dragging it over)

Homework:

pg. 299 21-31 odd 71 and 75

**Challenge Questions:** How do translations, the amplitude and the period changes translate to general functions?

## Week 6 Honors Precalculus

### Monday:

No Do Now

1. Quiz: only able to grade calculator portion so far, but clear that I was unclear about some things so that the majority of the class did not do well.
  - a. in lieu of this, the quiz will not be counted against anyone  
instead I gave everyone an extra 100 in their hw grade, as a thanks for going through what I can only assume was a terrible experience
2. Clear that I need more feedback, after every homework assignment I will ask students to come to the board to show what they got for select hw problems. This way we both have a better idea of how we are doing
  - a. <http://www.miniwebtool.com/random-name-picker/>
3. **have student who did well pass out calculators**
4. **warm up elmo**
5. What are the kinds of transformations we can have? (think of it = intuition)
  - . Reflection: over x or y axis, think of it like a reflecting pool, or hanging upside down  
<http://archwall.xyz/city-lights-reflected-water-twilight-reflection-wallpapers/>
  - a. Translation: think of it as picking up the graph and putting it down in a new place
  - b. stretch/compress: think of it like blowing up or deflating a balloon with a picture on it, or rolling out a piece of dough
6. Organize by what affects y-values (combine transformations)
7. go over amplitude in depth
  - . What does it mean to be a function's mean value or resting state

**@10:40 write hw on the board:**

What is the amplitude of this function?

1.  $-2\cos(x)$
2.  $4+2\sin(x)$
3.  $-3(1+\sin(x))$
4.  $200\cos(x) - 9$

Review the unit circle and its coordinates

### Tuesday:

Do Now: draw as much of the first quadrant of the unit circle as you can, without consulting your notes

1. Go over the do now
2. Have students go up and write answers to hw on the board: Kristen, Osamah, Harriet, Olivia, Melindah, Kylee

**\*\*Have student pass out calculators**

**\*\*\*Pass out quizzes while they do this**

- a. Ask if students got other answers
- b. Have students defend their work
2. Vertical shift **worked with  $d+\sin(x)$  now we talk about  $d$**  ( $\cos(x)$  +/-  $x$ )
  - . do it with vertical stretch

- a. do it with reflection
- 3. Start Period:
  - . compare to "stretch"  $1/b$  vs. "squish"  $b$
  - a. define the period
  - b. How does our stretch affect the period?

HW: Find the amplitude, and period. Describe the vertical shift. Review the unit circle

- 1.  $-2 + \cos(6(x-1))$
- 2.  $-3\sin(2x-4)$
- 3.  $4 + \frac{1}{5}\cos(\pi x + 2)$
- 4.  $5(2 - \sin(4x))$

### Wednesday:

Do Now: Draw the fourth quadrant of the unit circle

- 1. Go over hw:
  - a. A.(1), K (2), M (3), I (4) K, A
- 2. Reference angle portion of the quiz:  $[0, \pi/2]$  (so always positive); X-Wing trick
  - . [http://vignette1.wikia.nocookie.net/starwars/images/8/80/X-wing\\_Fathead.png/revision/latest?cb=20131012080921](http://vignette1.wikia.nocookie.net/starwars/images/8/80/X-wing_Fathead.png/revision/latest?cb=20131012080921)
- 3. Only problem with evaluating trig functions was that we need to be sure to find and use r
- 4. Any questions about what we went over yesterday?

### Thursday:

Do Now: Evaluate the six trig functions for  $(-6, 2)$

- 1. Go over hw: P, E, N, M, J, I
- 2. Do a few examples to ensure understanding:
  - a.  $7(\sin(2+x) - 3)$
  - b.  $211 - \cos(-x - 7)$
  - c.  $4(5 - 2\sin(-3(x+2)))$
- 3. Create our function based on the description
  - . go to other doc, that way can be projected
  - . [https://docs.google.com/document/d/1qfz\\_VkUxFnxJKOEAEEnxiwn8cdivxbRDXaR\\_t4JYfm6Q/edit](https://docs.google.com/document/d/1qfz_VkUxFnxJKOEAEEnxiwn8cdivxbRDXaR_t4JYfm6Q/edit)

### Friday:

Reminders for quiz:

Simplify as much as possible

no radicals in the denominator

leave your answer in radians

describe the difference between the parent function and the problem

## Week 11 College Level Precalculus

Monday: The sine graph

Materials: 4 circles cut in half

Lesson: Graph of the unit circle, what could it look like? We already have six functions

- Sin, the height seems like a good place to start
- Pull out them circles! And tape them on the board
- Show the video at 1.5\* <https://www.youtube.com/watch?v=2LK7vcSR9Zs>
- Create the xy chart
- Start the graph of sin of x, focus on how to label the axes

HW: Graph  $\sin(x)$  at home to be passed in

Tuesday:

Do Now: List of 3 recyclable and 3 non-recyclable items in the classroom

- What is the domain?
- What is the range?
- What are the x-intercept(s)?
- What are the y-intercept(s)?
- Local extrema?
- Symmetry? (It's odd)
- If finish early start the self-discovery activity

HW: pg. 299 #9 and 10

Wednesday:

Do Now:  $\log(6) + \log(x) - \log(2) = \log(3e)$

- Self-discovery activity
- Amplitude: the height from the mean, or rest, value of the function to its maximum or minimum.
  - $c f(x) = |c|$
- Period: the distance required for the function to complete one full cycle
  - $f(cx) = (2\pi)/c$
- What are the kinds of transformations we can have? (think of it = intuition)
  - Reflection: A transformation in which a geometric figure is **reflected** across a line, creating a mirror image. That line is called the axis of **reflection**
    - over x or y axis, think of it like a reflecting pool, or hanging upside down  
<http://archwall.xyz/city-lights-reflected-water-twilight-reflection-wallpapers/>
  - Translation: a transformation of the plane that slides every point of a figure the same distance in the same direction
    - think of it as picking up the graph and putting it down in a new place

- stretch/compress: think of it like blowing up or deflating a balloon with a picture on it, or rolling out a piece of dough

Thursday:

Do Now

- Go over the quiz after it is handed in
  - Graph a transformation in class. One of each, constants = 2
1.  $2\sin(x)$
  2.  $\frac{1}{2}\sin(x)$
  3.  $\sin(x)+3$
  4.  $-\sin(x)$
  5.  $-2\sin(x)+3$
- Discuss the order in which we perform operations, and how graph transformations are directly linked to the arithmetic we add on to our function



# Journals and Reflections

## Journal 1:

I am very excited to teach mathematics in general. I always loved this topic in high school, and when I got into college I found out it was even cooler than I had thought. Probably my favorite thing that I got to learn in high school was Pascal's Triangle, it makes expanding polynomials much easier, but it also has many amazing properties that show up in all kinds of mathematics, so if I had to choose a specific thing I want to teach, it would probably be that. Being a teacher is a bit nerve racking for me. As a student you expect a lot from your teachers, and as a teacher I want to be able to give them that, but I just don't know what I will be like as a teacher. So I would have to say that what I most hope to learn from my Practicum is that I am capable. I want to find out that I am capable of running creative lessons, gaining student respect, and teaching. I don't necessarily want to be the best, and since I will only be in charge of the class for about two in a half months that would be totally unreasonable. I just want to do a decent job, and run a class that I would like to be in. As I take charge of the classroom I am most aware of student discipline. Just when my mentor teacher has left the room I have had some issues with talking, and it became very clear to me just how artificial the authority of a teacher is. What is most on my mind for when I take over the class? How do I show that I am not someone to be walked all over without pushing back too hard?

## Journal 2:

Highlights of my week: (anecdotes about my week, effective methods of discipline or teaching strategies, etc.)

Helping a student after school, I have always preferred the one-on-one style of teaching, and getting to watch someone's understanding unfolding before my eyes :) Since I can't stay past 7th period I don't know how often I will get to do this, but hopefully a lot.

Challenge of my week and what I learned about myself, learning or teaching through it: (personal concerns, pressures, ineffective methods of discipline or teaching strategies or teaching strategies, time management problems, frustrations, etc.)

Tuesday 2/2, 3rd period I saw a student take out her phone twice. When I went over to confiscate it she pulled a magic trick hiding it under her jacket, her scarf and then either putting it in her bag or underneath her on the chair. I have no idea how I could deal with this in the future. In the end Ms. Razzaq saved the day. She talked to the student and after class she came and apologized, and we were able to talk it out. I complimented her on her phone hiding abilities, acknowledged that it can be a frustrating rule (can't look up things from the lesson), and that I am not trying to single her out but follow the school rule. The fact that she apologized really helped me, because I was so embarrassed when she wouldn't give me her phone and honestly did not know what to do.

One goal I have for the next week:

Interact with the students more by walking around and helping out.

Self-Evaluation: (record my growth, incorporation of new ideas, goals I met, etc.)

I am really starting to enjoy working with the students. I can tell because even though I feel short on time I offered to grade quizzes, and create a review sheet for students to study with for a test that was going to be on Friday (until the snow day). As I go around helping students with their work, I have found I do much better if I do the problem on my own, that way in a quick glance I know if they are on the right track or not, I feel like I am really improving with this.

Journal Question of the Week: In your placement, how are class rules and procedures established? How does the social context or culture of the school affect classroom management?

Some of the class rules are passed down from the principal, such as hall passes and one student out of the classroom at a time. Other rules are what my mentor teacher has found to work best in her classroom. The students were all trained in procedures at the beginning of the year. For example fifth period really likes to do group work, so my mentor teacher gives them a time limit to get into their groups. While the students were undergoing their training they had the same time limit, but it was more important that each time they split into groups they did so faster and faster until they could meet the time limit. The incentive of course was the ability to do group work, if they didn't split up fast enough then the class wouldn't be able to do group work again that quarter.

Someplace that the social context of the school is very important, is how teachers, at least in the math department, discipline unruly students. At Doherty Memorial the Principal and Vice Principals have a lot worse to deal with than somebody talking or falling asleep in class. So that these folk can get to the more serious problems, the teachers have devised their own methods of dealing with the students. When it gets to the point that other schools would send a student to the office, and even before that, here at Doherty Memorial High School the teachers send their student to a different classroom. Usually the classroom varies in grade level so that it is unlikely the disruptive student will know anyone (to distract) in the other classroom either.

### **Journal 3:**

Highlights of my week: (anecdotes about my week, effective methods of discipline or teaching strategies, etc.)

Finding the history of logarithms and turning it into a PowerPoint full of activities

Challenge of my week and what I learned about myself, learning or teaching through it:

Back Pain. On Tuesday 2/9 my back hurt so much that I could barely think. Luckily I am still observing, but as sitting is the worst I was a bit worried. I knew that it was going to be a bad day though and I brought a yoga mat and my heating pad. When the period started I sat down at my usual spot behind the teacher's desk, and I think the students could tell that I was rather unwilling to sit up. With the heating pad though, finally by the end of fifth period my back was cooperating and I could interact with the class again during sixth period.

One goal I have for the next week:

Interact with the students more so that they are comfortable working with me as I take over after the break

Self-Evaluation: (record my growth, incorporation of new ideas, goals I met, etc.)

I have the same goal as last week, but it was pretty cool because students know that they can call on me for help, or come to turn their homework in to me as well as Ms. Razzaq. In other words it was nice to hear the calls for Ms. Wellen, which I can only assume means the point of my goal is working out.

Journal Question of the Week: Describe the process that you will establish for reinforcing positive behavior and dealing with inappropriate behavior.

When I was a high schooler, especially as a junior and senior which are the students I am teaching, I was just beginning to make my own life decisions. To me this meant that I was showing I could be a responsible adult, and wanted to be treated as such. I think it is important to reflect on these feelings that I myself had, because I think it will give me great insight into the feelings of my students. I wanted people to ask my opinion and listen to what I was saying, and I think that is all I will need to give my students.

My plan is to speak honestly and calmly to my students. If they are misbehaving in class then the first time this occurs I will pull them into the hallway and have a conference with the student. During this conference we will discuss why they were acting out in whatever way it was and I will ask the student to help me come up with a plan to mitigate it. Of course the student will have a choice to come up with this plan, if they refuse then I will create my own, but they can give feedback at any point.

Also I want to have a suggestion box. Especially as a new teacher I am sure I will make many mistakes and will need the students help, and I want to hear from them. However, I do not want to interrupt class time to do so since 42 minutes of class is already all too short. Not only that but by the end of the day I am going to forget everything... so instead I will have a suggestion box. Putting names will of course be optional, but that way if a student puts their name, I can ask them any questions I may have or discuss compromises if I feel that they are asking too much.

I will discuss this more with my mentor teacher, but I think I want the first day back to be me going over my expectations and then a short lesson on the history of logarithms, and whatever the honors class will be doing (I haven't decided yet.)

#### **Journal 4:**

Journal Question of the Week: Describe how the physical environment and/or atmosphere affect teaching and learning.

The physical environment clearly affects the classroom. If the students are arranged in a way that makes it difficult for the teacher to reach them, then it is very tempting for the hard to reach students to goof off. Further, lessons can be slowed down as the teacher tries to reach a student who has a question. Also, the classroom should be arranged in a way that allows the student to easily get engaged in a lesson. If the goal for the day is lecture, the students should be facing the lecture. If the goal is group work, it should be easy for them to work together so they should be side by side or facing one another depending on the task. How the students are arranged is not the only important thing. The lighting also plays a vital role. If the lights are too dim, then students cannot take notes or will fall asleep. On the other hand if it is too bright, especially during a presentation, it can be uncomfortable or difficult to see. The walls also play a role in the physical environment. They cannot be too distracting, or students may have a difficult time staying on task, yet many teachers like to decorate their walls, not only to make it a more welcoming environment, but usually to encourage and help their students as well, often decorating with uplifting quotes.

The atmosphere is much more subtle, but I would argue much more important. Physical environment often adds to the atmosphere, but the atmosphere determines how your student treat you as a teacher, and affects how much the students will learn. Some aspects of the atmosphere cannot be helped, such as student goals. If students want to learn just enough to pass the class they may be disruptive. In fact a number of students take classes that are too easy for them, so that they may more easily receive good grades. These students can be disruptive all throughout the class, yet still get good grades. However, as long as the teacher maintains respect, they have a great amount of influence over the atmosphere. An atmosphere that is light-hearted is very conducive to student learning. It allows for mistakes from teacher and student alike, and allows students to be relaxed, which should help them when trying new things. On one end of this extreme, the classroom can be very strict. This kind of atmosphere can often make the students afraid to participate, and often backlashes on the teacher unless it is a part of the local culture, so it really does not work in the United States. On the other end we have too goofy. The problem here is that almost no learning gets done as students are often pulled along down side conversations, and fun days may happen a bit more than they should.

There are of course many ways to create a classroom environment that works well, and it really just falls down to teacher preference. There are many grey areas here, like where do we draw the line between accepting students for who they are, and maintaining classroom discipline? How much free reign are students given? All of these things affect how students learn, and even which students will thrive the most in that classroom. It is up to the teacher to try and balance the needs of everyone.

#### **Journal 5:**

Highlights of my week: (anecdotes about my week, effective methods of discipline or teaching strategies, etc.)

My Stand Up Hand Up Pair Up (SUHUPU) activity went so well that two Algebra II teachers came to watch, and my mentor teacher wants to use the same activity next year as well.

Challenge of my week and what I learned about myself, learning or teaching through it: (personal concerns, pressures, ineffective methods of discipline or teaching strategies or teaching strategies, time management problems, frustrations, etc.)

I moved too fast for my college level classes. They are really struggling with the material and there was supposed to be a test on Friday. Now I need to backtrack in the material, and make sure that everyone can complete this material. The classes have been working really hard and trying very hard to get it, and so I am happy to do this, but a real challenge for me is going to be getting the pacing down for my classes.

One goal I have for the next week:

Deliver lessons that will help my students succeed. Also try and emulate my values to the students, such as hard work, not giving up, and asking questions.

Self-Evaluation: (record my growth, incorporation of new ideas, goals I met, etc.)

I have been doing a lot of adjusting. I received some feedback from one of my classes that they would like me to write down what rule I use to complete each step. I am happy to say that I have successfully integrated this into my teaching now. I have been learning to adjust a lot, but I am enjoying the process.

Journal Question of the Week: Describe a lesson you observed. How did the teacher introduce, progress through, and wrap-up the lesson?

On January 25th in the 5th period Honors Calculus course, I learned a lot from the lesson that day. What my mentor teacher did was ask students to come up and write their answers for the homework on the board. Then, once everyone had finished writing their answers, the students would explain their reasoning and how they went about the problem. If there were any questions about the problem, then students would answer these as well. Once they had finished answering the question my mentor teacher would come up and reinforce what the student said, or clarify certain point that she thought was important. I like this a lot, because it asks students to really digest what they have been doing in order to explain it to the rest of the class. Then, by having the teacher come up afterwards it takes some of the pressure off of the student, especially since the teacher was careful to word things so as not to sound like she is telling students they are wrong, but instead is adding other important things on to the answer. This took up the entire class, but I think it was very important and well timed. The students had been going over the material for a couple days, especially because they had been struggling with it. I thought this was a great way to wrap up the material and ensure understanding.

**Journal 7:**

Highlights of my week: (anecdotes about my week, effective methods of discipline or teaching strategies, etc.)

The best part of my week was the support from all of my students. When I returned today a lot of my students were checking in with me and asking how I was, and I even received signed cards from every period, including the one I was not teaching for but only observing

Journal Question of the Week: Describe your thoughts about a teacher's responsibility to promote tolerance and understanding in schools.

I think that teachers have so many responsibilities that it is not fair to require anything else of them. To say that a teacher should teach their students not only the content, but social skills such as tolerance and understanding, is to say that teachers should be expected to parent their students. This isn't to say that it doesn't happen, that teachers do not help out parents in this way, most do. However this is just a teacher going above and beyond, as they are want to do, not them meeting a professional goal.

What should be/is required, is that teachers demonstrate these values. For some students it is enough to be treated in this way, for them to decide to treat others the same, and this cycle has to start somewhere. Massachusetts actually focuses on this in their student teacher programs with their emphasis on meeting diverse needs as well safe learning environments.

To be a role model, as every teacher is whether they are prepared to be or not, one should exemplify the qualities of tolerance and understanding. To live something, in many ways is to teach that something, but as far as responsibility for the teacher, I believe that is as far as it should go.

**Journal 8:**

Highlights of my week: (anecdotes about my week, effective methods of discipline or teaching strategies, etc.)

It was a really good week, I met my goal to enjoy teaching once more, some students who came for help outside of class did really well on the quiz I had given last Friday, I found out I get to go to a wedding for one of my cousins in July, I received a Clare Boothe Luce Award, and last weekend I attended a conference where I was able to meet Professors from grad schools I want to attend. Just a lot of really good things happened! (My clubs on campus are doing great too.)

Challenge of my week and what I learned about myself, learning or teaching through it: (personal concerns, pressures, ineffective methods of discipline or teaching strategies or teaching strategies, time management problems, frustrations, etc.)

Super busy, that's all I can think of.

One goal I have for the next week:

Come up with more activities for my classes to do and get to know my students better

Self-Evaluation: (record my growth, incorporation of new ideas, goals I met, etc.)

I have been working to incorporate cold call, and keep my students on task a bit more. I think it is going very well as I saw students snap back to attention with cold call and more students have been involved in the lesson. Also I had a lot of fun teaching my classes, so goal achieved!

Journal Question of the Week: How effective are your formal and informal assessment strategies in documenting student learning? How do these assessments show growth and change over time?

Student learning? I can tell from my informal assessments who was struggling and who has begun to grasp the material in class. But I wouldn't say I have a clear idea of who has learned how much. I have really worked hard on my informal assessments to give me a better idea of what students are struggling with before the next test or quiz day comes along.

Trying to find the balance between high expectations and attainable goals for my students has been an ongoing challenge for me. This is a major reason that I have tried very hard to develop my informal assessments more, and I would say that there has been a noticeable improvement for my students.

Long term improvement, I would say I have no idea, because I have been teaching for three weeks, and that is not very long at all. Not only that but I finished up a unit, and now I am starting a new one. In a couple of weeks though I will have a very good idea of learning and improvement in my classes, because I will see the difference between how students did this week at the beginning of the unit, and again about half way through a unit.

#### **Journal 9:**

Highlights of my week: (anecdotes about my week, effective methods of discipline or teaching strategies, etc.)

Worksheets are wonderful! I gave my college level precalc kids some worksheets that have a self-discovery purpose last week. The students seemed to really enjoy them, and they all completed their work and learned the material. Meanwhile it gave me a chance to talk one on one with different students, help those who had been struggling, and still go over all of the material I needed to that week.

Challenge of my week and what I learned about myself, learning or teaching through it: (personal concerns, pressures, ineffective methods of discipline or teaching strategies or teaching strategies, time management problems, frustrations, etc.)

I have had a tough time getting technology to work when I want it. I keep waiting to turn on the projector until I need it in the lesson even though I know that it will take a few minutes to warm up. Not only that but I couldn't remember one day how to get to the screen that lets me duplicate my monitor onto the projector, so then it took another few minutes just to figure that out, and the poor class had to just sit and wait. (because they are all good kids)

One goal I have for the next week:

Come up with some fun activities involving the unit circle

Self-Evaluation: (record my growth, incorporation of new ideas, goals I met, etc.)

I like that this week I was able to branch out. So far my classroom has only included me introducing the material through lecture. This week I was able to find some resources online that helped me diverge from this. This is my highlight of course, that I personally really enjoyed this. It also meant that students who learned quickly could work ahead, because it was time where everyone could move at a more flexible pace (their own pace with a deadline).

#### **Journal 10:**

Highlights of my week: (anecdotes about my week, effective methods of discipline or teaching strategies, etc.)

One of my students can be a bit of a problem. He is very distractible and likes to argue with the teacher. A strategy that really seems to work for this guy is to essentially bargain with him. He used his phone in front of me and wouldn't give it up, so I said he can either give me his phone, or he can't go to bathroom. For whatever reason he had great respect for this. Then the next time he was in class (three school days later) he wanted to eat a sandwich in class because he didn't have lunch. Ms. Razzaq has told me she prefers for the students not to eat in her class, but I also understand that being hungry makes it very hard to focus. I told this student he could eat it if he was quiet and helped me clean the classroom up after the bell rang. He behaved all throughout class and then, even when I had forgotten, was by my desk at the end of class asking if I had a broom.

Challenge of my week and what I learned about myself, learning or teaching through it: (personal concerns, pressures, ineffective methods of discipline or teaching strategies or teaching strategies, time management problems, frustrations, etc.)

Getting grades together on time has/is a real problem for me. Projects are a true pain in the tucas because they need to keep your students busy, but then you have to spend just as much time grading them!

One goal I have for the next week:



Be more purposeful in my planning.

Self-Evaluation: (record my growth, incorporation of new ideas, goals I met, etc.)

I think that I have really become comfortable in the classroom. As with driving, this is at first a double edged sword, where I am more comfortable so my students feel more welcomed in the classroom, yet when I am running low on time I also tend not to plan as thoroughly as I would like. Which the biggest part of that is not having example problems ready or my notes available to me in the classroom.

On the good side, I have noticed that the way I introduced material this week really helped my students. There was always a smooth transition from one topic to the next, and so there was a clear build-up of ideas. This meant that I was able to continue “teaching” the old material to my students, while still introducing new things every day.

Journal Question of the Week: Describe examples of cooperative learning and discuss how the children interact with each other. How is learning documented during cooperative grouping?

Examples of cooperative learning are worksheets that ask students to “derive” the formula they are trying to learn that day, or projects that ask students to apply everything that they have learned so far on the material, and giving them little to no teacher help. Students naturally group together during this process when they are allowed to in order to help each other understand. Of course some students prefer to learn alone, and students will always group up with the same friends, so the teacher should put students in well-formed groups from time to time, but overall students will do the hard part for the teacher pretty well.

Cooperative learning is measured in the same exact ways that lectured learning is. The teacher can have the students fill out worksheets, at the end of the class the students can be asked a set of probing questions, and tests and quizzes can also be used to measure progress.

#### **Journal 11:**

Highlights of my week: (anecdotes about my week, effective methods of discipline or teaching strategies, etc.)

The trig book on Friday was a lot of fun. It was a nice change of pace for everyone, that helped students work on their spatial reasoning and other skills that don’t get addressed in the classroom very often.

Challenge of my week and what I learned about myself, learning or teaching through it: (personal concerns, pressures, ineffective methods of discipline or teaching strategies or teaching strategies, time management problems, frustrations, etc.)

Tuesday was awful. My 6th period was awful and rude to me, and I had almost no sleep the night before. I did not react very well at the end (once they left), and I was not sure where my

mentor teacher was or how to handle my students. They were going behind my desk, stealing my chair, changing seats when they should not have been, talking over me, being rude to each other, one student screamed shut up at another, and someone else was throwing things at the student two rows in front of them.

One goal I have for the next week:

Work with friends sooner on my nonlinear optimization homework, so that I can get a full night's sleep as often as possible. Also when my kids act up be willing to send them out of the room, don't let it get too far out of hand.

Self-Evaluation: (record my growth, incorporation of new ideas, goals I met, etc.)

After Tuesday I have learned to act. And by that I mean always pretend things are going well. I suppose that was the main difference with these last couple of weeks and my time teaching before, was that I always had a smile on my face no matter what. I would say that I have relearned this skill, and now use it consciously.

Journal Question of the Week: How are you using student performance to inform your planning and teaching?

(Graphs for Period 4)

My do nows are often directly tied to what we learned the day before, or material we need from the past to help us move forward. In this way I can see how students are doing understanding the material and focus in on the parts that are confusing students.

A great example of this is fourth period where I quiz my students at the end of class. I then grade these quizzes where the lowest score is a 70/100. Based on this I can give students next day feedback on their graphing skills, which we have been focusing on during class.

### Week 2 Hours Log:

Date	Subjects	Activities	Hours	Notes
1/25/2016	3-Precalc college	Observed (attendance, passes, enter grades)	1	I like how Ms. Razzaq graphed the new things on the board (like students in their notebook) but projected the old well known functions for comparison. Also she talked about how exponential functions are useful to students now, which is nice. She also "took notes" on the board (wrote important properties next to where they show up on examples). Also today she used $d: [-2, 2]$ instead of making the chart, reviewed what $[]$ means.

	4-Precalc honors	Observed (attendance, passes, enter grades)	1	
	5-AP Calculus AB	Observed (attendance, passes, enter grades)	1	Have the students who wrote answers on the board come up and explain when there was a question about it, and then Ms. Razzaq would come up and clarify the question too so not all pressure on student
	6-Precalc college	Observed (attendance, passes, enter grades)	1	
	Prep			
		Total	4	
Date	Subjects	Activities	Hours	Notes
1/26/2016	3-Precalc college	Observed (attendance, passes, enter grades)	1	Go over the most difficult hw problems (students ask as hw is checked), point out important properties, student involvement with graphing calculators
	4-Precalc honors	Observed (attendance, passes, enter grades)	1	Lets students solve algebraically or graphically depending on what they prefer
	5-AP Calculus AB	Observed (attendance, passes, enter grades)	1	Clock buddies, best at the end of class! Also keep the sheets (students forget)
	6-Precalc college	Observed (attendance, passes, enter grades)	1	pre-chose students ("voluntold") that do not normally participate
	Prep	Lesson Planning, classroom supply prep	2	Change date, write do nows
		Total	6	
Date	Subjects	Activities	Hours	Notes
1/27/2016	3-Precalc college	Observed (attendance, passes, enter grades)	1	Willing to improvise lesson to teach students calculator skills they will need to know when it was clear they did not have them, it even changed the hw assignment
	4-Precalc honors	Observed (attendance, passes, enter grades)	1	Brought students back on track with a joke

	5-AP Calculus AB	Observed (attendance, passes, enter grades)	1	
	6-Precalc college	Observed (attendance, passes, enter grades)	1	Did not show students the smartphone app like in 3rd period, only used graphing calculators
	Prep	Lesson Planning	1	
		Total	5	
Date	Subjects	Activities	Hours	Notes
1/28/2016	3-Precalc college	Observed (attendance, passes, enter grades)	1	
	4-Precalc honors	Observed (attendance, passes, enter grades)	1	
	5-AP Calculus AB	Observed (attendance, passes, enter grades)	1	
	6-Precalc college	Teaching	1	No prior warning, I went over the do now and their homework, greeted students at the door, and they were very well behaved
	Prep			
		Total	4	
Date	Subjects	Activities	Hours	Notes
1/29/2016	3-Precalc college	Observed (attendance, passes, enter grades)	1	One student just always talks when she is done with work, next time I should just move her seat
	4-Precalc honors	Observed (attendance, passes, enter grades)	1	
	5-AP Calculus AB	Observed (attendance, passes, enter grades)	1	

	6-Precalc college	Observed (attendance, passes, enter grades)	1	
	Prep			
		Total	4	
		Total Weekly Hours	23	

**Week 11 Hours Log:**

Date	Subjects	Activities	Hours	Notes
4/11/2016	3-Precalc college	Teaching: Intro to the sin graph	1	The students said they liked the cut out circles as a way of describing the sine function. In the future label the circles.
	4-Precalc honors	Teaching: arctan(x)	1	
	5-AP Calculus AB	Teaching (Sub = study)	1	Had to talk to students about their phones a lot today, probably won't give them warnings tomorrow, too much work.
	6-Precalc college	Teaching: Intro to the sin graph	1	Had to threaten to throw a student out of the room so that he would behave, when I did he also seemed to check out a bit... I also need to talk to the trio of gals at the front, they are generally good students, yet they like to chit chat too much.
	Prep	Grading!! Lesson planning	2	
		Total	6	
Date	Subjects	Activities	Hours	Notes
4/12/2016	3-Precalc college	Teaching: sin graph	1	
	4-Precalc honors	Teaching: arctan(x)	1	

	5-AP Calculus AB	Teaching (Study)	1	Ran into some resistance about cell phones. After talking to Ms. Razzaq it was decided that this is not a battle worth having
	6-Precalc college	Teaching: sin graph	1	Today things got out of hand again. Students were almost always talking over me, and eventually one of my students got so upset at the other students, she started yelling at them to shut up and would have started a fight if the other student was so inclined. Tomorrow my goal is to not let things get so out of hand.
	Prep	Reflection, lesson planning	2	
		Total	6	
Date	Subjects	Activities	Hours	Notes
4/13/2016	3-Precalc college	Teaching: Graph Transformations	1	The talking in this class is starting to get out of hand as well. I don't think it makes sense to address it the day before break the way I am with 6th period, I think I need to come back from break pretty serious though. I don't really want to kick out one of the girls in the front, I think they could put up a pretty good fight, maybe the first time I move the student's seat and then the second time the student leaves. *Also talked to B and he and N are going to switch seats. This may not go well, if so I can always move N again.
	4-Precalc honors	Teaching: Test Review/Feedback, evaluating inverse trig exactly	1	Students were pretty kind about the fact that there will be a test tomorrow, considering I'm pretty sure I forgot to announce it earlier. Because it was long period though I was able to go over what will be on the test very in depth, and cover how to evaluate the inverse trig functions at a point :)
	5-AP Calculus AB	Teaching	1	Found students eating in the room at lunch...
	6-Precalc college	Teaching: Graph Transformations	1	I threatened students and they were actually pretty good. Anytime I got close they quieted down. I can't keep this up though because it still takes too much time

				for students to be quiet and it is hard on the good kids, though less so
	Prep	Reflection, Grading, Designing the Test	2	
		Total	6	
Date	Subjects	Activities	Hours	Notes
4/14/2016	3-Precalc college	Teaching: Graphs of stretching and translations	1	
	4-Precalc honors	Teaching: Test on inverse functions of graphs	1	
	5-AP Calculus AB	(Prep)		
	6-Precalc college	Teaching: Graphs of stretching and translations	1	
	Prep	Reflection Lesson Planning and grading	3	
		Total	6	
Date	Subjects	Activities	Hours	Notes
4/15/2016	3-Precalc college	Teaching	1	Last Day before break, students have some free time
	4-Precalc honors	Teaching	1	
	5-AP Calculus AB	Teaching	1	
	6-Precalc college	Teaching	1	
	Prep	Reflection, Lesson Planning	2	

		Total	6	
		Total Weekly Hours	30	



# Surveys

College Level Precalculus

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks?

0 time

How do you like to study for tests and quizzes?

I don't

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

Doesn't Matter

Do you prefer handing in homework for a grade, or correcting it yourself?

for a grade

Is the class moving too fast? Just right? or too slow?

too slow

Why did you answer the above question the way you did?

Its all easy

What do you want to do when you graduate high school?

go to wyo state

What is your favorite subject in school?

math

What are some of your hobbies?

sports

Are there any applications of mathematics that you would like to see?

accounting

Any extra comments or feedback on ways to improve the class?

ms. wellen is a good teacher

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks?

3 hours

How do you like to study for tests and quizzes?

1/5/no

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

I prefer both

Do you prefer handing in homework for a grade, or correcting it yourself?

Handing in homework for a grade

Is the class moving too fast? Just right? or too slow?

in between, too fast, and just right

Why did you answer the above question the way you did?

Because we sometimes go fast on harder subjects, the easy ones.

What do you want to do when you graduate high school?

go through to college.

What is your favorite subject in school?

Science

What are some of your hobbies?

Dance

Are there any applications of mathematics that you would like to see?

Any

Any extra comments or feedback on ways to improve the class?

None

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks?

5 hrs

How do you like to study for tests and quizzes?

I study for 30 min doing practice problems or reviewing notes.

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

I prefer both methods

Do you prefer handing in homework for a grade, or correcting it yourself?

no prefeers.

Is the class moving too fast? Just right? or too slow?

Just right

Why did you answer the above question the way you did?

because I was told to answer it truthfully.

What do you want to do when you graduate high school?

go to a 4yr college for either computer science

Civil Engineering

What is your favorite subject in school?

math

What are some of your hobbies?

Football, cars, snowboarding

Are there any applications of mathematics that you would like to see?

no nope

Any extra comments or feedback on ways to improve the class?

no

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks?

none

How do you like to study for tests and quizzes?

I dont

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

on the test

Do you prefer handing in homework for a grade, or correcting it yourself?

correcting yourself

Is the class moving too fast? Just right? or too slow?

to slow

Why did you answer the above question the way you did?

because I think its to slow

What do you want to do when you graduate high school?

Electrical Engineering

What is your favorite subject in school?

Engineering

What are some of your hobbies?

Baseball

Are there any applications of mathematics that you would like to see?

no

Any extra comments or feedback on ways to improve the class?

no

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks?

≈ 30 mins or less

How do you like to study for tests and quizzes?

I like to do review problems

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

Depends on the subject we're going over

Do you prefer handing in homework for a grade, or correcting it yourself?

Correcting it myself

Is the class moving too fast? Just right? or too slow?

Just right

Why did you answer the above question the way you did?

This class moves at a speed I'm used to

What do you want to do when you graduate high school?

I plan on going to school for biology and becoming a PA.

What is your favorite subject in school?

Human anatomy/Physiol

What are some of your hobbies?

Reading, listening to music, sometimes I write poems

Are there any applications of mathematics that you would like to see?

Not sure

Any extra comments or feedback on ways to improve the class?

You're a good student teacher

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks? 1 hour a day

How do you like to study for tests and quizzes?

Just by doing review sheets

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

A mixture of both.

Do you prefer handing in homework for a grade, or correcting it yourself? None was for a grade

Is the class moving too fast? Just right? or too slow?

Just right

Why did you answer the above question the way you did?

because that's how I like the class to move

What do you want to do when you graduate high school?

Go to college

What is your favorite subject in school?

Math

What are some of your hobbies?

Reading magazines

Are there any applications of mathematics that you would like to see?

None

Any extra comments or feedback on ways to improve the class?

None.

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks? *About one hour*

How do you like to study for tests and quizzes?

*I find it more helpful to go over problems that will be more difficult than what is on the test.*

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

*I like to see most of both.*

Do you prefer handing in homework for a grade, or correcting it yourself?

*Correcting it myself is better.*

Is the class moving too fast? Just right? or too slow?

*Just right*

Why did you answer the above question the way you did?

*I had no preference because I am used to it in my classes.*

What do you want to do when you graduate high school?

*I want to go to college and get a degree in computer engineering.*

What is your favorite subject in school?

*History and biology*

What are some of your hobbies?

*Video, drawing, etc.*

Are there any applications of mathematics that you would like to see?

*Nope*

Any extra comments or feedback on ways to improve the class?

*I like the way the class is going and I really like the way the teacher is doing.*



This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks? whenever I have homework.

How do you like to study for tests and quizzes?

I just over look the materials

Do you find it more helpful to go over problems that will be more difficult than what is on the test?

Or do you prefer to have problems just like what will be on the test? Yes. I like to see examples worked out - it helps me work it through.

Do you prefer handing in homework for a grade, or correcting it yourself?

either way. I think it might motivate me to make sure everything is correct.

Is the class moving too fast? Just right? or too slow?

I feel like some concepts are easy and some are difficult

Why did you answer the above question the way you did?

All depending on the concept

What do you want to do when you graduate high school?

I want to do bio-med engineering

What is your favorite subject in school?

I do not have one this year.

What are some of your hobbies?

well it's MMA / mixed martial arts)

Are there any applications of mathematics that you would like to see?

I'm not sure. Maybe enough to get placed college for the olympics

Any extra comments or feedback on ways to improve the class?

Nope im all good.

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

Maybe three total

How do you like to study for tests and quizzes?

looking over notes

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

I like difficult problems because then I should be able to handle the easier questions.

Do you prefer handing in homework for a grade, or correcting it yourself?

correcting my self, when I get it back if it was corrected I would not care to look it over.

Is the class moving too fast? Just right? or too slow?

just right :)

Why did you answer the above question the way you did?

because I am understanding the lessons way better.

What do you want to do when you graduate high school?

some type of business career

What is your favorite subject in school?

English

What are some of your hobbies?

I work so much I have no time for hobbies

Are there any applications of mathematics that you would like to see?

No

Any extra comments or feedback on ways to improve the class?

Should probably be more assertive. A lot of students talk over you and it's hard to learn if others are talking. But you're doing great I'm learning a lot!

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

2 hours

How do you like to study for tests and quizzes?

looking over the book

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

on the test

Do you prefer handing in homework for a grade, or correcting it yourself?

Correcting it

Is the class moving too fast? Just right? or too slow?

Why did you answer the above question the way you did?

because it is not moving quick its a steady pace or kind of slow sometimes.

What do you want to do when you graduate high school?

Fire investigation

What is your favorite subject in school?

history

What are some of your hobbies?

running

Are there any applications of mathematics that you would like to see?

no

Any extra comments or feedback on ways to improve the class?

no

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks?

30 minutes

How do you like to study for tests and quizzes?

I don't

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

go over the more difficult ones

Do you prefer handing in homework for a grade, or correcting it yourself?

correcting myself, but I don't mind getting a grade

Is the class moving too fast? Just right? or too slow?

just right

Why did you answer the above question the way you did?

because it's my way of learning  
the best way

What do you want to do when you graduate high school?

get a job, then maybe college

What is your favorite subject in school?

math

What are some of your hobbies?

golfing

Are there any applications of mathematics that you would like to see?

no

Any extra comments or feedback on ways to improve the class?

just keep it the same

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks? *About 2-3 hours.*

How do you like to study for tests and quizzes?

*They're simple and very normal, nothing crazy.  
It was good.*

Do you find it more helpful to go over problems that will be more difficult than what is on the test?  
Or do you prefer to have problems just like what will be on the test?

*Going over hard problems, and having problems like the test*

Do you prefer handing in homework for a grade, or correcting it yourself?

*Handing in homework*

Is the class moving too fast? Just right? or too slow?

*Too slow.*

Why did you answer the above question the way you did?

*People are constantly doing/repeating 'easy' material.*

What do you want to do when you graduate high school?

*Business Administration*

What is your favorite subject in school?

*English / Math*

What are some of your hobbies?

*Volley ball, soccer*

Are there any applications of mathematics that you would like to see?

*No, it's good as it is.*

Any extra comments or feedback on ways to improve the class?

*Teacher mustn't ~~be~~ be nervous,  
must be outgoing*

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

How do you like to study for tests and quizzes?

I truthfully don't study. I don't know how to study for math.

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

Problems that will be on the test help me more.

Do you prefer handing in homework for a grade, or correcting it yourself?

For a grade.

Is the class moving too fast? Just right? or too slow?

Too fast, sometimes.

Why did you answer the above question the way you did?

Because we learn something in like two days and are expected to be experts on it the next day.

What do you want to do when you graduate high school?

Go to college.

What is your favorite subject in school?

Science

What are some of your hobbies?

Reading, reading

Are there any applications of mathematics that you would like to see?

no

Any extra comments or feedback on ways to improve the class?

no

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks? 2 hours or less

How do you like to study for tests and quizzes?

Reading, studying, and reviewing

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Yes  
Or do you prefer to have problems just like what will be on the test? Yes

Do you prefer handing in homework for a grade, or correcting it yourself?

Correcting it yourself

Is the class moving too fast? Just right? or too slow?

Just right

Why did you answer the above question the way you did?

because I am a fast learner and I like to be challenged

What do you want to do when you graduate high school?

be a doctor

What is your favorite subject in school?

math

What are some of your hobbies?

Reading, playing sports, and listening to music

Are there any applications of mathematics that you would like to see?

Yes

Any extra comments or feedback on ways to improve the class?

No

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks?

45 min  
20

How do you like to study for tests and quizzes?

by reading and doing problems

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

problems that are harder

Do you prefer handing in homework for a grade, or correcting it yourself?

handing in homework for a grade

Is the class moving too fast? Just right? or too slow?

just right

Why did you answer the above question the way you did?

because the class is moving at a good pace and I can keep up

What do you want to do when you graduate high school?

go to college

What is your favorite subject in school?

math / science / biology

What are some of your hobbies?

reading / playing video games / watching movies

Are there any applications of mathematics that you would like to see?

Any extra comments or feedback on ways to improve the class?



This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks?

30mins on homework

How do you like to study for tests and quizzes?

I usually go over the stuff we did the day before, Review Day (worksheets + notes)

Do you find it more helpful to go over problems that will be more difficult than what is on the test?

Or do you prefer to have problems just like what will be on the test?

Both help, a lot. Gives me a Review on both.

Do you prefer handing in homework for a grade, or correcting it yourself?

I would rather hand in homework.

Is the class moving too fast? Just right? or too slow?

too slow

Why did you answer the above question the way you did?

I understand the topics, but its just moving slow.

What do you want to do when you graduate high school?

Be a math teacher maybe.

What is your favorite subject in school?

MATH

What are some of your hobbies?

listening to music.

Are there any applications of mathematics that you would like to see?

n o

Any extra comments or feedback on ways to improve the class?

~~the~~ more group work will help!

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks?

5 hours

How do you like to study for tests and quizzes?

doing practice problems

going over notes

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

prefer to go over what is on the test

Do you prefer handing in homework for a grade, or correcting it yourself?

handing in homework for a grade

Is the class moving too fast? Just right? or too slow?

just right

Why did you answer the above question the way you did?

because I never feel rushed

(with the pace of the class)

What do you want to do when you graduate high school?

nothing

What is your favorite subject in school?

math

What are some of your hobbies?

dog walking

Are there any applications of mathematics that you would like to see?

Any extra comments or feedback on ways to improve the class?

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

30 minutes

How do you like to study for tests and quizzes?

I don't

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

more difficult

Do you prefer handing in homework for a grade, or correcting it yourself?

correcting it myself

Is the class moving too fast? Just right? or too slow?

Too slow

Why did you answer the above question the way you did?

This class is very easy for me

What do you want to do when you graduate high school?

computer programming

What is your favorite subject in school?

computer science

What are some of your hobbies?

video games

Are there any applications of mathematics that you would like to see?

No

Any extra comments or feedback on ways to improve the class?

No

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

1-2 hrs

How do you like to study for tests and quizzes?

review problems

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

problems that are just like the test

Do you prefer handing in homework for a grade, or correcting it yourself?

for a grade

Is the class moving too fast? Just right? or too slow?

a little fast

Why did you answer the above question the way you did?

because I still have ~~trouble~~ trouble with some of the material, ~~and~~ so by the time I understand it we're already on something else.

What do you want to do when you graduate high school?

I would like to ~~become a teacher~~ go to college full time and work full time

What is your favorite subject in school?

psychology

What are some of your hobbies?

cheer, dancing, track.

Are there any applications of mathematics that you would like to see?

im not sure what this is asking

Any extra comments or feedback on ways to improve the class?

extra problem examples

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

How do you like to study for tests and quizzes?

I Don't study

Do you find it more helpful to go over problems that will be more difficult than what is on the test?  
Or do you prefer to have problems just like what will be on the test?

Problems that will be on the test

Do you prefer handing in homework for a grade, or correcting it yourself?

Correcting it yourself

Is the class moving too fast? Just right? or too slow?

Some time too fast other times its just right

Why did you answer the above question the way you did?

at times when were being taught  
a lesson I wont get it right away and its  
hard to follow on

What do you want to do when you graduate high school?

go to college for criminal justice

What is your favorite subject in school?

math

What are some of your hobbies?

work

Are there any applications of mathematics that you would like to see?

NO

Any extra comments or feedback on ways to improve the class?

go slower on harder things

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

1 hour of other mathematic

How do you like to study for tests and quizzes?

Sleeping

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

Just like what will be on the test

Do you prefer handing in homework for a grade, or correcting it yourself?

Correcting it myself

Is the class moving too fast? Just right? or too slow?

Just right I guess

Why did you answer the above question the way you did?

N/A

What do you want to do when you graduate high school?

Something with computers

What is your favorite subject in school?

math!!!

What are some of your hobbies?

Videogames and sleeping

Are there any applications of mathematics that you would like to see?

N/A

Any extra comments or feedback on ways to improve the class?

Maybe something interactive on the computer

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

30 minutes to 1 hour depending on difficulty

How do you like to study for tests and quizzes?

study with my friends

Do you find it more helpful to go over problems that will be more difficult than what is on the test?  
Or do you prefer to have problems just like what will be on the test?

problems that will be just like the test

Do you prefer handing in homework for a grade, or correcting it yourself?

correcting it myself as we go over it

Is the class moving too fast? Just right? or too slow?

too fast at times

Why did you answer the above question the way you did?

What do you want to do when you graduate high school?

become a full time nurse  
in a hospital

What is your favorite subject in school?

english

What are some of your hobbies?

reading

Are there any applications of mathematics that you would like to see?

Any extra comments or feedback on ways to improve the class?

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

1-2 hours, about 10-15 minutes per day

How do you like to study for tests and quizzes?

I may better understand if we had more time to study  
for the upcoming tests

Do you find it more helpful to go over problems that will be more difficult than what is on the test?  
Or do you prefer to have problems just like what will be on the test?

I prefer to have problems that are similar to what will be on the test

Do you prefer handing in homework for a grade, or correcting it yourself?

Correcting it myself

Is the class moving too fast? Just right? or too slow?

Just right

Why did you answer the above question the way you did?

being honest

What do you want to do when you graduate high school?

find employment to work

What is your favorite subject in school?

learning science and math

What are some of your hobbies?

reading & reading

Are there any applications of mathematics that you would like to see?

more

Any extra comments or feedback on ways to improve the class?

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

1 hour a day

How do you like to study for tests and quizzes?

Reviewing notes/homework

Do you find it more helpful to go over problems that will be more difficult than what is on the test?  
Or do you prefer to have problems just like what will be on the test?

Just like the test

Do you prefer handing in homework for a grade, or correcting it yourself?

correcting it myself

Is the class moving too fast? Just right? or too slow?

Just right

Why did you answer the above question the way you did?

What do you want to do when you graduate high school?

go to college

What is your favorite subject in school?

Art

What are some of your hobbies?

painting, going to the gym

Are there any applications of mathematics that you would like to see?

no

Any extra comments or feedback on ways to improve the class?

no

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?  
not alot but enough.

How do you like to study for tests and quizzes?  
I don't know I just study

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

I like to have a mixture of both just so it can make feel less stress because I'll know I can do it.

Do you prefer handing in homework for a grade, or correcting it yourself?

I like to correct myself so I can see what I am doing and actually fix it.

Is the class moving too fast? Just right? or too slow?

It is moving fine

Why did you answer the above question the way you did?

because I feel like it is moving fine.

What do you want to do when you graduate high school?

go to college.

What is your favorite subject in school?

~~ph~~ Psychology

What are some of your hobbies?

cheering and shopping

Are there any applications of mathematics that you would like to see?

NO

Any extra comments or feedback on ways to improve the class?

NO.

College

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks?

hour aday or less depend on the h.w

How do you like to study for tests and quizzes?

practice the examples that we take in class

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

yes is more helpful

Do you prefer handing in homework for a grade, or correcting it yourself?

correcting myself

Is the class moving too fast? Just right? or too slow?

I think fast

Why did you answer the above question the way you did?

truth lol.

What do you want to do when you graduate high school?

going to college study Engineering

What is your favorite subject in school?

This class

What are some of your hobbies?

art, drawing

Are there any applications of mathematics that you would like to see?

yes

Any extra comments or feedback on ways to improve the class?

no.

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

Spent on average 30 minutes per day on math outside of class.

How do you like to study for tests and quizzes?

Study with a friend and review notes.

Do you find it more helpful to go over problems that will be more difficult than what is on the test?  
Or do you prefer to have problems just like what will be on the test?

Prefer to have problems just like what will be on the test.

Do you prefer handing in homework for a grade, or correcting it yourself?

Prefer correcting it myself.

Is the class moving too fast? Just right? or too slow?

Just right.

Why did you answer the above question the way you did?

The class is moving at a good pace and I am able to keep up with the work.

What do you want to do when you graduate high school?

Continue to school and then work.

What is your favorite subject in school?

Math.

What are some of your hobbies?

Reading and playing video games.

Are there any applications of mathematics that you would like to see?

No.

Any extra comments or feedback on ways to improve the class?

Nothing to add, but I hope the class continues to be a good experience.

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks?

20 mins

How do you like to study for tests and quizzes?

flashcards

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

More difficult

Do you prefer handing in homework for a grade, or correcting it yourself?

correcting it yourself

Is the class moving too fast? Just right? or too slow?

too slow

Why did you answer the above question the way you did?

- MY MIND TOLD ME TOO

- The class is easy

What do you want to do when you graduate high school?

go to college

What is your favorite subject in school?

Engineering

What are some of your hobbies?

Golf

Are there any applications of mathematics that you would like to see?

No

Any extra comments or feedback on ways to improve the class?

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

10 min

How do you like to study for tests and quizzes?

Flash cards.

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

Oh yes for sure.

Do you prefer handing in homework for a grade, or correcting it yourself?

Is the class moving too fast? Just right? or too slow?

Why did you answer the above question the way you did?

Because this is the way that I think.

What do you want to do when you graduate high school?

College

What is your favorite subject in school?

Chemistry.

What are some of your hobbies?

Drawing

Are there any applications of mathematics that you would like to see?

No

Any extra comments or feedback on ways to improve the class?

Everything is great.

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks?

an hour

How do you like to study for tests and quizzes?

review my notes

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

just like whats on the test

Do you prefer handing in homework for a grade, or correcting it yourself?

homework for grade

Is the class moving too fast? Just right? or too slow?

just right

Why did you answer the above question the way you did?

it just feels right

What do you want to do when you graduate high school?

go to college

What is your favorite subject in school?

HISTORY

What are some of your hobbies?

SPORTS

Are there any applications of mathematics that you would like to see?

NO.

Any extra comments or feedback on ways to improve the class?

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks?

I would not know as I'm not studying

How do you like to study for tests and quizzes?

I like studying by myself, but I like to study with my friends. I like to study by myself, but I like to study with my friends.

Do you find it more helpful to go over problems that will be more difficult than what is on the test?

Or do you prefer to have problems just like what will be on the test?

go over problems that are more difficult than what will be on the test.

Do you prefer handing in homework for a grade, or correcting it yourself?

correcting it myself

Is the class moving too fast? Just right? or too slow?

Just right

Why did you answer the above question the way you did?

because the class was going at a good pace.

What do you want to do when you graduate high school?

Attend college, travel

What is your favorite subject in school?

Science

What are some of your hobbies?

Reading, playing basketball, etc.

Are there any applications of mathematics that you would like to see?

No

Any extra comments or feedback on ways to improve the class?

Keep it the way it is, it's good.



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On average how much time did you spend on mathematics outside of class in the past couple of weeks? 0

How do you like to study for tests and quizzes?

After school

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

Both helps

Do you prefer handing in homework for a grade, or correcting it yourself?

Correcting ourself. So we can see what we did wrong

Is the class moving too fast? Just right? or too slow?

Sometimes too fast but mostly just right

Why did you answer the above question the way you did?

Depends on who am around and how I feel

What do you want to do when you graduate high school?

Attend / go to college

What is your favorite subject in school?

Anything in Science except Chemistry

What are some of your hobbies?

Netflix

Are there any applications of mathematics that you would like to see?

No thanks

Any extra comments or feedback on ways to improve the class?

No

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

1 hour a week

How do you like to study for tests and quizzes?

Reviewing notes

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

Just the ones that are on the test

Do you prefer handing in homework for a grade, or correcting it yourself?

Correcting it myself

Is the class moving too fast? Just right? or too slow?

Just right

Why did you answer the above question the way you did?

There is a perfect pace for everyone to learn at

What do you want to do when you graduate high school?

undecided

What is your favorite subject in school?

Bio & Science

What are some of your hobbies?

sports, playing games

Are there any applications of mathematics that you would like to see?

Yes

Any extra comments or feedback on ways to improve the class?

yes

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks?

15 minutes a night

How do you like to study for tests and quizzes?

I don't

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

just like the test

Do you prefer handing in homework for a grade, or correcting it yourself?

handing it in

Is the class moving too fast? Just right? or too slow?

just right

Why did you answer the above question the way you did?

because I could imagine it in a better way

What do you want to do when you graduate high school?

go to college

What is your favorite subject in school?

D.T.V

What are some of your hobbies?

SPRINT, work

Are there any applications of mathematics that you would like to see?

NO

Any extra comments or feedback on ways to improve the class?

NO

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks? *Not any*

How do you like to study for tests and quizzes?

*I don't like to study*

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

*more difficult*

Do you prefer handing in homework for a grade, or correcting it yourself?

*correcting it myself*

Is the class moving too fast? Just right? or too slow?

*Just right*

Why did you answer the above question the way you did?

~~Not sure~~ *I get what is going on  
so I guess it's all good.*

What do you want to do when you graduate high school?

*Go to college for Business Administration  
with concentration in  
Management.*

What is your favorite subject in school?

*Pre-calc*

What are some of your hobbies?

*None*

Are there any applications of mathematics that you would like to see?

*No*

Any extra comments or feedback on ways to improve the class?

*More group work*

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On average how much time did you spend on mathematics outside of class in the past couple of weeks? None

How do you like to study for tests and quizzes?

I don't usually

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

like what will be on the test

Do you prefer handing in homework for a grade, or correcting it yourself?

hand it in

Is the class moving too fast? Just right? or too slow?

Too fast

Why did you answer the above question the way you did?

Very confusing

What do you want to do when you graduate high school?

Attend college

What is your favorite subject in school?

psychology

What are some of your hobbies?

Sports

Are there any applications of mathematics that you would like to see?

I don't know

Any extra comments or feedback on ways to improve the class?

Nope

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

from 10 to 20 minutes

How do you like to study for tests and quizzes?

I prefer to go over problems and try to solve them

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

problems that are harder than what is on the test

Do you prefer handing in homework for a grade, or correcting it yourself?

handing in homework

Is the class moving too fast? Just right? or too slow?

the class is moving at a good pace

Why did you answer the above question the way you did?

because I usually get a lot of problems in class and I feel like I have to do them. Also I feel like I have to do them.

What do you want to do when you graduate high school?

I want to go to college and get a degree

What is your favorite subject in school?

math

What are some of your hobbies?

hiking, reading, playing sports, etc.

Are there any applications of mathematics that you would like to see?

no

Any extra comments or feedback on ways to improve the class?

no

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

10 mins per day MON-Fri  
-15 mins

How do you like to study for tests and quizzes?

re quiz myself, and re-read the vocab

Do you find it more helpful to go over problems that will be more difficult than what is on the test?  
Or do you prefer to have problems just like what will be on the test?

problems that are more difficult

Do you prefer handing in homework for a grade, or correcting it yourself?

~~correcting it myself~~ correcting it myself because it helps me learn the material better

Is the class moving too fast? Just right? or too slow?

a little fast

Why did you answer the above question the way you did?

Because we usually change topics as soon as we just started to understand the last topic, so the info doesn't stay in my head

What do you want to do when you graduate high school?

we want to get my masters degree as a psychiatric nurse

What is your favorite subject in school?

science

What are some of your hobbies?

we like music, going to the gym (nature walks)

Are there any applications of mathematics that you would like to see?

we don't know

Any extra comments or feedback on ways to improve the class?

no

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

2-3hr a week

How do you like to study for tests and quizzes?

going over problems / worksheets related to what will be on the test to refresh my memory

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

problems just like what will be on the test

Do you prefer handing in homework for a grade, or correcting it yourself?

grade

Is the class moving too fast? Just right? or too slow?

just right

Why did you answer the above question the way you did?

because we aren't moving too fast, when someone doesn't understand we stop & go over it

What do you want to do when you graduate high school?

go to college → bachelors → get an intern that will be related to my major → hopefully get my masters

What is your favorite subject in school?

Ap psych

What are some of your hobbies?

drawing, hiking, crafting

Are there any applications of mathematics that you would like to see?

no

Any extra comments or feedback on ways to improve the class?

Need to explain everything more thoroughly ← I don't know if that is spelled right



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On average how much time did you spend on mathematics outside of class in the past couple of weeks? 1 hour per day

How do you like to study for tests and quizzes? Reading the textbook & doing problems

Do you find it more helpful to go over problems that will be more difficult than what is on the test?

Or do you prefer to have problems just like what will be on the test?

Do you prefer handing in homework for a grade, or correcting it yourself?

Is the class moving too fast? Just right? or too slow? A little faster

Why did you answer the above question the way you did? Because we have to finish on time

What do you want to do when you graduate high school? go to college

What is your favorite subject in school?

What are some of your hobbies?

Are there any applications of mathematics that you would like to see?

Any extra comments or feedback on ways to improve the class?

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks?

10-15 min. a night

How do you like to study for tests and quizzes?

for math, I like to review class notes, previous homework, and watch youtube videos if necessary.

Do you find it more helpful to go over problems that will be more difficult than what is on the test?  
Or do you prefer to have problems just like what will be on the test?

I prefer problems that like what will be on the test. that way, I feel more prepared and less worried about things that I won't need to know

Do you prefer handing in homework for a grade, or correcting it yourself?

I prefer handing in homework.

Is the class moving too fast? Just right? or too slow?

It's moving at an ok pace.

Why did you answer the above question the way you did?

I think the pace we're going is very reasonable. The work that we're given is not the toughest, but it's a good challenge to "make ourselves" do better work.

What do you want to do when you graduate high school?

I will start a four year college, but do not know what I'll go after that for the time being.

What is your favorite subject in school?

mathematics.

What are some of your hobbies?

- blogging, being on math,

Are there any applications of mathematics that you would like to see?

- how to do more and things like that

Any extra comments or feedback on ways to improve the class?

- teach everything that is up as possible

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

20 hours

How do you like to study for tests and quizzes?

look over the material

Do you find it more helpful to go over problems that will be more difficult than what is on the test?  
Or do you prefer to have problems just like what will be on the test?

Problems that will be more difficult than what is on the test. Need to go over what we want to be used on.

Do you prefer handing in homework for a grade, or correcting it yourself?

~~None~~ No preference.

Is the class moving too fast? Just right? or too slow?

Just right

Why did you answer the above question the way you did?

Nothing is slowing down anything in the class.

What do you want to do when you graduate high school?

I would like to go to college and major in Aerospace Engineering.

What is your favorite subject in school?

Math

What are some of your hobbies?

Reading, chess, etc.

Are there any applications of mathematics that you would like to see?

Nothing.

Any extra comments or feedback on ways to improve the class?

None

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

20

How do you like to study for tests and quizzes?

Review Questions

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

just like the test

Do you prefer handing in homework for a grade, or correcting it yourself?

a grade

Is the class moving too fast? Just right? or too slow?

A little too fast

Why did you answer the above question the way you did?  
I feel very overwhelmed with work

What do you want to do when you graduate high school?  
Go to a 4 year college

What is your favorite subject in school?  
MATH

What are some of your hobbies?  
- golf, - math problems

Are there any applications of mathematics that you would like to see?

no

Any extra comments or feedback on ways to improve the class?  
to teach the subject before you hand out work

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

2 hr

How do you like to study for tests and quizzes?

practice problems

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

what will be on the test

Do you prefer handing in homework for a grade, or correcting it yourself?

correct yourself

Is the class moving too fast? Just right? or too slow?

too slow

Why did you answer the above question the way you did?

I felt it was going to slow

What do you want to do when you graduate high school?

4-year college

What is your favorite subject in school?

social studies

What are some of your hobbies?

sports

Are there any applications of mathematics that you would like to see?

not in particular

Any extra comments or feedback on ways to improve the class?

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

2 1/2 hours

How do you like to study for tests and quizzes?

I dk

Do you find it more helpful to go over problems that will be more difficult than what is on the test?  
Or do you prefer to have problems just like what will be on the test?

Yes

Do you prefer handing in homework for a grade, or correcting it yourself?

Correcting it yourself, you can learn

Is the class moving too fast? Just right? or too slow?

Too fast

Why did you answer the above question the way you did?

Teacher moves through too fast

What do you want to do when you graduate high school?

Be a teacher

What is your favorite subject in school?

Biology

What are some of your hobbies?

Sports

Are there any applications of mathematics that you would like to see?

No

Any extra comments or feedback on ways to improve the class?

Please cover topics more thoroughly and

Don't waste too much time on the board.

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On average how much time did you spend on mathematics outside of class in the past couple of weeks? *None*

How do you like to study for tests and quizzes?

*I just read my notes*

Do you find it more helpful to go over problems that will be more difficult than what is on the test?  
Or do you prefer to have problems just like what will be on the test?

*I find it more helpful to go over problems just like what will be on the test*

Do you prefer handing in homework for a grade, or correcting it yourself?

*Correcting myself*

Is the class moving too fast? Just right? or too slow?

*Too fast sometimes*

Why did you answer the above question the way you did?

*Because we sometimes go too fast and I don't understand.*

What do you want to do when you graduate high school?

*Be in the medical field*

What is your favorite subject in school?

*Ap Psychology*

What are some of your hobbies?

*Sport*

Are there any applications of mathematics that you would like to see?

*no*

Any extra comments or feedback on ways to improve the class?

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On average how much time did you spend on mathematics outside of class in the past couple of weeks? 2 days a week

How do you like to study for tests and quizzes?

with my headphones playing video audio about the test.

Do you find it more helpful to go over problems that will be more difficult than what is on the test?  
Or do you prefer to have problems just like what will be on the test?

I prefer have problems just like what will be on the test.

Do you prefer handing in homework for a grade, or correcting it yourself?

Correcting it myself.

Is the class moving too fast? Just right? or too slow?

Just right

Why did you answer the above question the way you did?

What do you want to do when you graduate high school?

I don't know

What is your favorite subject in school?

English

What are some of your hobbies?

Sports, Soccer, basket ball, volleyball, etc.

Are there any applications of mathematics that you would like to see?

yes

Any extra comments or feedback on ways to improve the class?

don't skip steps in the problems.



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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

only when I have homework assigned or have to study for a test

How do you like to study for tests and quizzes?

Taking good notes and having someone to help me with studying for my test and quizzes

Do you find it more helpful to go over problems that will be more difficult than what is on the test?

Or do you prefer to have problems just like what will be on the test?

I prefer problems just like what it will be on the test

Do you prefer handing in homework for a grade, or correcting it yourself?

I prefer handing in homework for a grade

Is the class moving too fast? Just right? or too slow?

Sometimes too fast

Why did you answer the above question the way you did?

sometimes I don't have a test/quize to soon after learning something new

What do you want to do when you graduate high school?

Go to college and take pre med major in a science course to get into medical school

What is your favorite subject in school?

It use to be math but now we not as confident as before so US History II this year is my favorite subject.

What are some of your hobbies?

I like to go to the gym or going to practice for track and field.

Are there any applications of mathematics that you would like to see?

building buildings

Any extra comments or feedback on ways to improve the class?

More time with the new subject being learned.

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

30 minutes or less per day

How do you like to study for tests and quizzes?

I like to make flash cards, and do a lot of solving problems - just a lot of hard work

Do you find it more helpful to go over problems that will be more difficult than what is on the test?  
Or do you prefer to have problems just like what will be on the test?

It's more helpful to go over problems that will be more difficult than what is on the test

Do you prefer handing in homework for a grade, or correcting it yourself?

handing in homework for a grade

Is the class moving too fast? Just right? or too slow?

It's moving just right, but I wish we could go a little faster

Why did you answer the above question the way you did?

because I'm a fast learner

What do you want to do when you graduate high school?

be a computer scientist, or a mathematician

What is your favorite subject in school?

math

What are some of your hobbies?

golf

Are there any applications of mathematics that you would like to see?

no

Any extra comments or feedback on ways to improve the class?

adding more problems, more challenging problems, more real world applications, more fun

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On average how much time did you spend on mathematics outside of class in the past couple of weeks? *Once a week*

How do you like to study for tests and quizzes? *I don't*

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test? *Problems that are like the test*

Do you prefer handing in homework for a grade, or correcting it yourself? *handing it in*

Is the class moving too fast? Just right? or too slow? *Just right*

Why did you answer the above question the way you did? *I understand what is going on*

What do you want to do when you graduate high school? *Health care*

What is your favorite subject in school? *Engineering*

What are some of your hobbies? *Bowling, Games*

Are there any applications of mathematics that you would like to see? *No*

Any extra comments or feedback on ways to improve the class?

## Honors Precalculus

4<sup>th</sup>

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

Every study period (5<sup>th</sup>) to do math homework or study for quizzes/test.

How do you like to study for tests and quizzes?

I study examples and notes given in class

Do you find it more helpful to go over problems that will be more difficult than what is on the test?

Or do you prefer to have problems just like what will be on the test?

I prefer hard questions in class than what is on the test.

Do you prefer handing in homework for a grade, or correcting it yourself?

I prefer correcting it myself

Is the class moving too fast? Just right? or too slow?

Just right

Why did you answer the above question the way you did?

Because I do not feel left behind or struggling too much. I feel that if I do badly, it is my fault not the teachers depending on if the content was taught

What do you want to do when you graduate high school?

I want to go to college when I graduate

What is your favorite subject in school?

My favorite subject is biology

What are some of your hobbies?

My hobbies include drawing and video games

Are there any applications of mathematics that you would like to see?

I would love to learn matrices (sp?)

Any extra comments or feedback on ways to improve the class?

To go over all content thoroughly before assigning homework on said content.

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On average how much time did you spend on mathematics outside of class in the past couple of weeks? 45 minutes a day

How do you like to study for tests and quizzes?

I make study guides

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

Problems like what would be on the test

Do you prefer handing in homework for a grade, or correcting it yourself?

Correcting it myself

Is the class moving too fast? Just right? or too slow?

Just right

Why did you answer the above question the way you did?

I understand what is going on in class, and I am able to follow along.

What do you want to do when you graduate high school?

Go to college and double major in music and writing

What is your favorite subject in school?

English

What are some of your hobbies?

Playing guitar, basketball, soccer, and reading

Are there any applications of mathematics that you would like to see?

Not really, but I do hope to use basic math in music

Any extra comments or feedback on ways to improve the class?

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

1-2 hours

How do you like to study for tests and quizzes?

Problems in the back and checking answers in the back.

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

More difficult.

Do you prefer handing in homework for a grade, or correcting it yourself?

Correcting it myself, mixture of both.

Is the class moving too fast? Just right? or too slow?

Just right. Depending on materials we are learning it can be too slow.

Why did you answer the above question the way you did?

Some materials are too easy and I understand them ~~even~~ more easy.

What do you want to do when you graduate high school?

Pre-med course for anesthesiology.

What is your favorite subject in school?

Science/Math

What are some of your hobbies?

~~Software~~ <sup>for</sup> editing (After Effects, Sony Vegas Pro, etc)  
Photography.

Are there any applications of mathematics that you would like to see?

Not any I can think of

Any extra comments or feedback on ways to improve the class?

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

1-2 hours

How do you like to study for tests and quizzes?

I don't

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

More difficult, so it will challenge me.

Do you prefer handing in homework for a grade, or correcting it yourself?

correcting it myself

Is the class moving too fast? Just right? or too slow?

a bit too fast

Why did you answer the above question the way you did?

I feel like I have understood the material halfway through the whole time we spend on it.

What do you want to do when you graduate high school?

Go to college for engineering or physics.

What is your favorite subject in school?

Physics/chemistry

What are some of your hobbies?

Cycling, Running, Soccer, snowboarding

Are there any applications of mathematics that you would like to see?

I don't think so

Any extra comments or feedback on ways to improve the class?

No.



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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

1 hour

How do you like to study for tests and quizzes?

I don't

Do you find it more helpful to go over problems that will be more difficult than what is on the test?  
Or do you prefer to have problems just like what will be on the test?

Problems on test

Do you prefer handing in homework for a grade, or correcting it yourself?

Correcting

Is the class moving too fast? Just right? or too slow?

Right

Why did you answer the above question the way you did?

It's not fast

It's not slow

What do you want to do when you graduate high school?

Go to college

What is your favorite subject in school?

Gym

What are some of your hobbies?

Gym / Baseball / Golf

Are there any applications of mathematics that you would like to see?

Nope

Any extra comments or feedback on ways to improve the class?

Nope

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

1

How do you like to study for tests and quizzes?

Notes and online videos

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

Just like

Do you prefer handing in homework for a grade, or correcting it yourself?

Correcting it

Is the class moving too fast? Just right? or too slow?

little too fast

Why did you answer the above question the way you did?

Sometimes i miss something then I am  
Set behind all week

What do you want to do when you graduate high school?

Grind

What is your favorite subject in school?

Science

What are some of your hobbies?

Lacrosse, basketball, drawing, reading

Are there any applications of mathematics that you would like to see?

Quantum Physics

Any extra comments or feedback on ways to improve the class?

Practice more problems that will be  
on the test instead of only practicing  
simple problems

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

30 minutes 2 days a day.  
(If you consider programming as math, then this increases to an hour or so)

How do you like to study for tests and quizzes?

Mostly by looking at material and see if I don't know things. I would then practice problems that I find difficult.

Do you find it more helpful to go over problems that will be more difficult than what is on the test?

Or do you prefer to have problems just like what will be on the test?

Doing difficult problems surely would improve my grades on tests.

Do you prefer handing in homework for a grade, or correcting it yourself?

Correcting it myself. Homeworks are not about getting them correct, they are about learning from mistakes.

Is the class moving too fast? Just right? or too slow?

Just right

Why did you answer the above question the way you did?

Based on actual experience

What do you want to do when you graduate high school?

Go to college or try to change the world somehow.

What is your favorite subject in school?

Computer Science!

What are some of your hobbies?

Playing soccer, developing simple, short videogames, reading books.

Are there any applications of mathematics that you would like to see?

Not sure.

Any extra comments or feedback on ways to improve the class?

Apply it to real life could help.

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

2 hours a day

How do you like to study for tests and quizzes?

Review the book on my own

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

Those that are more difficult

Do you prefer handing in homework for a grade, or correcting it yourself?

Correcting it myself

Is the class moving too fast? Just right? or too slow?

Too slow

Why did you answer the above question the way you did?

Because that's how it is

What do you want to do when you graduate high school?

Go to college

What is your favorite subject in school?

Mathematics.

What are some of your hobbies?


Reading, basketball, eating, playing video games.

Are there any applications of mathematics that you would like to see?

No.

Any extra comments or feedback on ways to improve the class?

More difficult problems, less review.  
Quality homework more challenging.



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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

ABOUT ~~10-15~~ minutes a day  
15-30

How do you like to study for tests and quizzes?

Videos and repetition of examples

Do you find it more helpful to go over problems that will be more difficult than what is on the test?  
Or do you prefer to have problems just like what will be on the test?

Just like on a test

Do you prefer handing in homework for a grade, or correcting it yourself?

Correcting myself

Is the class moving too fast? Just right? or too slow?

~~Very fast~~ ~~too~~ ~~much~~ Fast

Why did you answer the above question the way you did?

BC I feel when we learned something we move on to something else but lately its been getting average

What do you want to do when you graduate high school?

Bio ~~major~~ major /

What is your favorite subject in school?

MATH

What are some of your hobbies?

lots of community work

Are there any applications of mathematics that you would like to see?

Not sure

Any extra comments or feedback on ways to improve the class?

This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks?

hour and a half

How do you like to study for tests and quizzes?

I don't

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

Harder

Do you prefer handing in homework for a grade, or correcting it yourself?

Correcting yourself

Is the class moving too fast? Just right? or too slow?

Why did you answer the above question the way you did?

Perfect learning curves

What do you want to do when you graduate high school?

Go to college

What is your favorite subject in school?

~~Math~~ Science/Engineering

What are some of your hobbies?

Listening to music, Gym, etc.

Are there any applications of mathematics that you would like to see?

Coding

Any extra comments or feedback on ways to improve the class?

No

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On average how much time did you spend on mathematics outside of class in the past couple of weeks? 2 hours

How do you like to study for tests and quizzes?

Khan academy

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

Just like what will be on the test

Do you prefer handing in homework for a grade, or correcting it yourself?

handing it in

Is the class moving too fast? Just right? or too slow?

Just Right

Why did you answer the above question the way you did?

The class is moving at a decent pace.

What do you want to do when you graduate high school?

College

What is your favorite subject in school?

Psychology

What are some of your hobbies?

~~gym~~ Gym, Sports, photography

Are there any applications of mathematics that you would like to see?

~~No~~ No

Any extra comments or feedback on ways to improve the class?

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On average how much time did you spend on mathematics outside of class in the past couple of weeks?

1 - 1 1/2 hours

How do you like to study for tests and quizzes?

go over homework, notes

Do you find it more helpful to go over problems that will be more difficult than what is on the test? Or do you prefer to have problems just like what will be on the test?

more difficult

Do you prefer handing in homework for a grade, or correcting it yourself?

correcting it

Is the class moving too fast? Just right? or too slow?

Just right

Why did you answer the above question the way you did?

I'm learning the material at the right pace

What do you want to do when you graduate high school?

go to college

What is your favorite subject in school?

Math or Science

What are some of your hobbies?

tennis, golf, hockey

Are there any applications of mathematics that you would like to see?

not sure I can think of

Any extra comments or feedback on ways to improve the class?



This survey is anonymous. Please answer truthfully to the best of your abilities. The goal of this survey is to create a better classroom learning environment for as many students as possible.

On average how much time did you spend on mathematics outside of class in the past couple of weeks? 30 minutes to an hour

How do you like to study for tests and quizzes?

I review all questions + hw and maybe try to do the problems backwards

Do you find it more helpful to go over problems that will be more difficult than what is on the test?

Or do you prefer to have problems just like what will be on the test?

both, because then I know what to expect and don't end up studying what I don't need

Do you prefer handing in homework for a grade, or correcting it yourself?

correcting it myself

Is the class moving too fast? Just right? or too slow?

sometimes fast but usually just right

Why did you answer the above question the way you did?

I tend to grasp topics pretty quickly but sometimes I feel myself needing to retrace myself things

What do you want to do when you graduate high school?

become a forensic scientist / lyricist

What is your favorite subject in school?

english / sciences

What are some of your hobbies?

music, photography, writing, ~~com~~ design

Are there any applications of mathematics that you would like to see?

I enjoy the graphing but not much

Any extra comments or feedback on ways to improve the class?

maybe work a bit slower

more hands on